ORDER NO. ARD81090091C2-23

Service Manual

Cassette Deck

RS-M273

(Silver Face
Black Face)

Microprocessor Controlled Cassette Deck
with 3-Head, Closed Loop System

This is the Service Manual for the following areas.
[D] ····· For all European areas except United Kingdom.
[B] ····· For United Kingdom.

DOLBY SYSTEM

RS-M250 MECHANISM SERIES

Specifications

Track system:	4-track 2-channel stereo recording and playback
Tape speed:	4.8 cm/s
Wow and flutter:	0.037% (WRMS), ±0.12% (DIN)
Frequency response:	Metal tape; 18 – 21,000 Hz 25 – 20,000 Hz (DIN) 30 – 19,000 Hz ±3 dB
	CrO_2 tape; 18 – 20,000 Hz 25 – 19,000 Hz (DIN) 30 – 18,000 Hz ±3 dB
	Normal tape; 18 – 18,000 Hz 25 – 17,000 Hz (DIN) 30 – 15,000 Hz ±3 dB
Signal-to-noise ratio:	Dolby* NR in; 69 dB (above 5 kHz) Dolby NR out; 59 dB (signal level = max. recording level, CrO_2 type tape)
Fast forward and rewind time:	Approx. 80 seconds with C-60 cassette tape
Inputs:	MIC; sensitivity 0.25 mV, input impedance 10 kΩ applicable microphone impedance 400Ω – 10 kΩ LINE; sensitivity 60 mV, input impedance 40 kΩ
Outputs:	LINE; output level 700 mV, output impedance 3.5 kΩ or less load impedance 22 kΩ over HEADPHONES; output level 125 mV (at 8Ω) load impedance 8 – 125Ω
Bias frequency:	85 kHz
Motor:	2-motor system (closed loop double capstan system)
Heads:	3-head system; 1 SX head for recording, 1 SX head for playback 1 double-gap ferrite head for erasure
Power requirement:	AC; 110/125/220/240 V 50/60 Hz; Pre-set power voltage 220 V 50 Hz; Pre-set power voltage 240 V for United Kingdom
Power consumption:	25 W
Dimensions:	43.0 cm(W) × 10.9 cm(H) × 33.5 cm(D)
Weight:	6.5 kg

Specifications are subject to change without notice.
* 'Dolby' and the double-D symbol are trademarks of Dolby Laboratories.

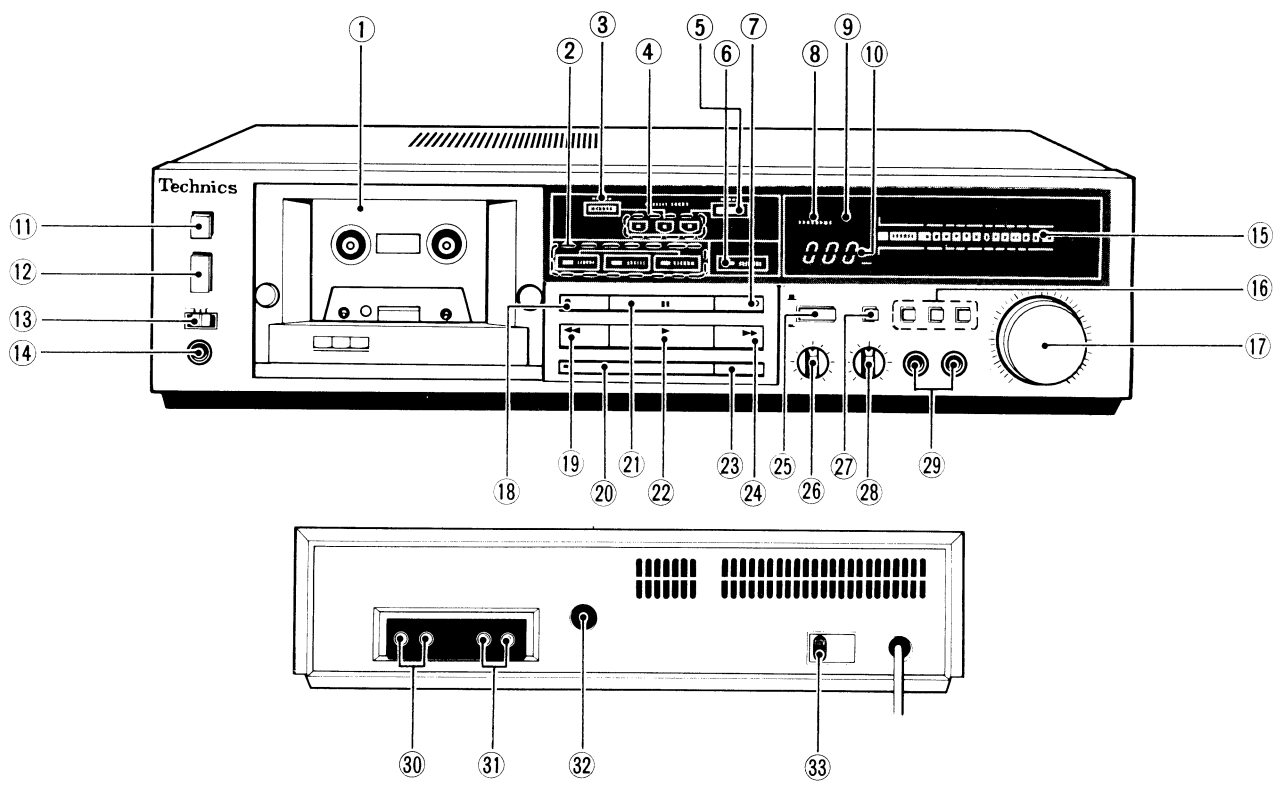
Technics

Matsushita Electric Trading Co., Ltd.
P.O. Box 288, Central Osaka Japan

CONTENTS

ITEM	PAGE
LOCATION OF CONTROLS AND COMPONENTS	1
DISASSEMBLY INSTRUCTIONS	2
CHIP PARTS REPAIR PROCEDURE	3
TECHNICAL EXPLANATION	3
MEASUREMENT AND ADJUSTMENT METHODS	4
MN1400RZ (IC601): EACH TERMINAL FUNCTION AND WAVEFORM	12
TROUBLESHOOTING OF MAIN CONTROL CIRCUIT	16
ELECTRICAL PARTS LOCATION	18
BLOCK DIAGRAM	18
SCHEMATIC DIAGRAM (MAIN SECTION/FL METER SECTION)	19
CIRCUIT BOARDS (MAIN CIRCUIT BOARD/FL METER CIRCUIT BOARD)	20
SCHEMATIC DIAGRAM (MAIN CONTROL SECTION)	21
CIRCUIT BOARD (MAIN CONTROL CIRCUIT BOARD)	21
WIRING CONNECTION DIAGRAM	22
MECHANICAL PARTS LOCATION	23
BELT LOCATION	24
CABINET PARTS LOCATION	25

LOCATION OF CONTROLS AND COMPONENTS



① Cassette holder
② Auto tape select indicators [ATS (Normal • CrO_2 • Metal)]
③ Tape monitor source indicator [source]
④ Three head indicator
⑤ Monitor tape indicator [tape]
⑥ Dolby NR indicator [Dolby NR]
⑦ Record muting switch [rec mute (O)]
⑧ Memory stop position indicator [memory]
⑨ Repeat position indicator [repeat]
⑩ Digital electronic counter [electronic counter]
⑪ Eject button [eject]
⑫ Power switch [power (push on)]
⑬ Timer start switch [timer (rec • off • play)]
⑭ Headphones jack [phones]
⑮ FL (fluorescent level) meter
⑯ Memory switch [memory (stop • off • repeat)]
⑰ Input level controls [input level (L-R)]
⑱ Record button and indicator [rec (O)]
⑲ Rewind button [rew (◀◀)]
⑳ Stop button [stop (■)]
㉑ Pause button and indicator [pause (❚❚)]
㉒ Playback button and indicator [play (▶)]
㉓ Reset button [counter reset]
㉔ Fast forward button [ff (▶▶)]
㉕ Monitor switch [monitor (source • tape)]
㉖ Bias fine adjustment control [bias adjust]
㉗ Dolby NR switch [Dolby NR (in • out)]
㉘ Output level control [output level]
㉙ Microphone jacks [mic (L • R)]
㉚ Line output jacks [LINE OUT (L • R)]
㉛ Line input jacks [LINE IN (L • R)]
㉜ Remote control connector [REMOTE CONTROL]
㉝ Voltage selector [VOLTAGE SELECTOR]

MESSUNGEN UND EINSTELL METHODEN

RS-M273 DEUTSCH

Bandwähler (Band-Betriebsart-Schalten)
Zur Meßeinstellung mit Testbändern ohne Bandspürlöcher (A und B) die Band-Betriebsarten wie folgt schalten.
(Für normale Band-Betriebsart einfach ein normales Band in den Cassettenhalter einführen.)

- Metallband-Betriebsart-Einstellung:
  Die Metallband-Betriebsart wird erreicht durch trennen der dreistiftigen Buchse [C] vom dreistiftigen Ständer [C] auf dem P.C.B. (Gedrucktes Schaltbrett).
- CrO_2-Band-Betriebseinstellung:
  Zuerst die dreistiftige Buchse [C] auf dieselbe Weise wie oben trennen. Danach, wie in rechtsstehender Abbildung gezeigt, den Anschluß – 3 des dreistiftigen Ständers mit einem Verbindungsdraht erden.

Anm.:
Wenn nicht anders vorgeschrieben, Kurbelschalter und Steuereinrichtungen auf die folgenden Positionen stellen.

- Für saubere Köpfe sorgen.
- Für saubere Tonwelle und Andruckrolle sorgen.
- Auf normale Raumtemperatur achten: 20±5°C (68±9°F).
- Monitorschalter: Band-Position.
- Vormagnetisierungsregler: Zentrum.
- Eingangsregler: MAX.
- Ausgangsregler: MAX.
- Dolby-Schalter: Aus.
- Spitzenwertschalter: LINE.
- Timer-Wahlschalter: OFF.
- Speicherschalter: OFF.

Gegenstand	Messung und Einstellung
Ⓐ Druck der Andruckrolle Bedingung: * Wiedergabe Meßgerät: * Bandzugmesser (max. 500gr)	1. Gerät auf "Wiedergabe" schalten. 2. Bandzugmesser über die Spitze der Andruckwollenwelle (A) haken und entgegen der Andruckrichtung Andruckrolle-Tonwelle ziehen (Fig. 2). 3. Bandzugmesser in dem Augenblick ablesen, in dem die Andruckrolle von der Tonwelle abhebt und sich zu drehen aufhört. **NORMALWERT: 130±20gr (Zufuhrseite)** **NORMALWERT: 350±50gr (Aufwickelseite)**
Ⓑ Bandzug der Aufwickelrolle Bedingung: * Wiedergabe Meßgerät: * Cassetten-Drehmomentmesser (QZZSRKCT)	1. Cassetten-Drehmomentmesser in das Gerät montieren. 2. Gerät auf "Wiedergabe" schalten. **NORMALWERT: 40^{+15}_{-10}gr-cm**
Ⓒ Bandgeschwindigkeit Bedingung: * Wiedergabe * Betnebsart „Normalband" Meßgerät: * Elektronischer Digitalzähler * Testband...QZZCWAT	**Genaulgkeit der Bandgeschwindigkeit** 1. Den Meßaufbau zeigt Fig. 3. 2. Testband (QZZCWAT 3000Hz) wiedergeben und Ausgangssignal dem Zähler zuführen. 3. Die Messung soll im mittleren Teil des Bandes erfolgrn. 4. Frequenz messen. 5. Beträgt die auf dem Testband aufgezeichnete Frequenz 3000Hz, so ergibt sich die Genauigkeit nach folgender Formal: Genauigkeit der Bandgeschwindigkeit = $\frac{f-3000}{3000}$ x 100 (%) worin f die gemessene Frequenz ist. **NORMALWERT: ± 1,5%** **Einstellung:** 1. Den mittleren Teil des Testbandes wiedergeben. 2, 3. Die Einstellschraube VR Vgl Fig. 1 so verstellen, daß eine Frequenz von 3000Hz angezeig wird. **Schwankung der Bandgeschwindigkeit:** Messung, wie oben beschrieben für Anfang, mittleren Teil und Ende des Testbandes wiederholen und Schwankung wie folgt bestimmen: Schwankung = $\frac{f_1-f_2}{3000}\times 100(\%)$ f_1 = Maximalwert f_2 = Minimalwert **NORMALWERT: weniger als 1,0%**

Gegenstand	Messung und Einstellung
Ⓓ Einstellung der Eingangsabtastzeit Bedingung: * Stop Meßgerät: * Oszilloskop	1. Oszilloskop an Klemme (17) von IC601 anschließen. 2. Mit Oszilloskop die Zeit des Eingangsabtastsignals wie in Fig. 4 dargestellt messen. **NORMALWERT: ca. 5msec—6,25msec** 3. Falls der gemessene Wert vom oben genannten beträchtlich abweicht, wie folgt erforderliche Justierung vornehmen. **Einstellung:** 1. Die Stelle (B) unterbrechen und den Punkt (A) im Verdrahtungsplan auf der Hauptleiterplatte kurzschließen. (Siehe Seite 5). 2. Den Löschstrom messen. 3. Überprüfen, ob der gemessene Löschstrom zwischen 5msec und 6,25msec liegt. 4. Falls er außerhalb dieses Bereichs liegt, folgende Schritte ausführen. • Beträgt der Löschstrom weniger als 5msec den Punkt (B) kurzschließen. • Beträgt der Löschstrom meher als 6,25msec die Stellen (A) unterbrechen.
Ⓔ Kopfausrichtung und Justierung des Bandlaufs Bedingung: * Aufnahma und Wiedergabe Meßgerät: * Röhrenvoltmeter * Oszillograf * NF-Generator * Abschwächer * Widerstand (600Ω) * Testband (Bandlaufwe-Betrachtungsvorrichtung mit Spiegel) ... QZZCRD * Testband (azimuth)...QZZCFM * Kassettenband ...C-120	Im vorliegenden Gerät ist unsere eigene Doppelwinde mit 2-Motoren für verbesserte Grundleistung verwendet. Infolgedessen macht diese die Genauigkeit des Bandlaufs extrem hoch. Bei Gebrauch des Gerätes (besonders bei Justierung nach Erneuerung des kombinierten Kopfes oder der Druckrille-L) die unten beschriebenen Verfahren zum Aufrechterhalten der vorgeschriebenen Leistung sorgfältig einhalten. **Hinweise** • Druckrolle-L (Zufuhrseite) nicht justieren, außer dem absolut notwendigen Fall, da sie den Bezug für Höhenhustierungen des Aufnahme/Wiedergabe- und Löschkopfes liefert. • Wenn der Aufnahme/Wiedergabekopf und die Druckrolle-L beide erneuert werden, den Aufnahme/Wiedergabekopf vor Erneuerung und Justierung der Druckrolle-L erneuerun und justieren. (Wenn die beiden gleichzeitig erneuert werden, erfährt die Justierung extreme Schwierigkeit, da kein Bezug für Bandlaufhöhe erhältlich ist). **a) Justierung des Aufnahme/Wiedergabekopfes** **Grobe Justierung** 1. Schrauben (A) und (B) voll im Uhrzeigersinn drehen. 2. Schraube (A) um eine Drehung und S hraube (C) um 4 Drehungen zurückstellen. 3. Schraube (B) so justieren, daß der Kopf zur Kopfgrundplatte parallel liegt. (Fig. 6-1). **Feineinstellung** **— Höheneinstellung —** 1. QZZCRD (Bandverlaufbeobachter) beladen und das Gerät auf PAUSE-Betriebsart stellen. Schrauben (B) und (C) feineinstellen. (Fig. 6-2). **— Justierung der Bahnneigung —** 1. Unter Einstellung des Gerätes auf WIEDERGABE-Betriebsart das Band während des Bandlaufs nicht gerollt oder verformt wird. (Bandlauf wird normwidrig beeinflußt, wenn Schraube (A) von der optimalen Position mehr als 1/2 Drehung abweicht. Also sorgfältig und genau justieren). 2. QZZCRD mit C-120 (RT-120LN usw.) ersetzen und Bandlauf über prüfen. (Fig. 7). Schraube (A) feineinstellen, wenn das Band während des Bandlaufs rollt oder verformt. **Elektrische Überprüfung über Bandlauf** **— Überprüfung des Löschverhältnisses —** 1. Das Prüfgerät wie in Fig. 8 gezeigt anschließen. 2. Bezugsblindtestband (QZZCRD) beladen. (Metallband). 3. Monitorwähler auf SOURCE-Position stellen und den Bandwähler auf METAL-Position stellen. 4. Vom AF-Oszillator über ATT zu LINE IN 100Hz-Signal geben. 5. ATT so justieren, daß der Ausgangspegel bei LINE OUT 0,7V erhält (Der Eingangspegel bei dieser Bedingung wird normaler Eingangspegel genannt). 6. ATT so justieren, daß der Eingangspegel 20dB über dem normalen Eingangspegel liegt.

Gegenstand	Messung und Einstellung
	Einstellung der Wiedergabefrequenz * Unterbrechen oder Kurzschließen der Schaltungsanschlußpunkte zur Einstellung des Frequenzganges bei Wiedergabe (siehe Fig. 13). * Der Frequenzgang mit kurzgeschlossenen Anschlußpunkten a (linker Kanal) und a' (rechter Kanal) und unterbrochenen Anschlußpunkten b (linker Kanal) und b' (rechter Kanal) wechselt je nach Bedingung an den Anschlußpunkten wie unten aufgeführt. Abwechselnde Kurzschließ-/Unterbrechbedingungen sind aufgrund der vor der Verschiffung vorgenommenen Feineinstellngen je nach Gerät verschieden. Falls Nachstellungen erforderlich sind, sollten die Ergebnisse möglichst genau den Standardwerten entsprechen.

Anschlußpunkt		4kHz	6kHz	8kHz	10kHz	12,5kHz
a (linker Kanal)	b (linker Kanal)					
a' (rechter Kanal)	b' (rechter Kanal)					
kurzgeschlossen	kurzgeschlossen	ungefähr +0,2dB	ungefähr 0,5dB	ungefähr 0,7dB	ungefähr 0,8dB	ungefähr 0,4dB
unterbrochen	kurzgeschlossen	ungefähr −0,2dB	ungefähr −0,6dB	ungefähr −0,8dB	ungefähr −1,2dB	ungefähr −2,0dB

Ⓖ Wiedergabe-Verstärkung Bedingung: * Wiedergabe * Ausgangsregler: MAX. Meßgerät: * Röhrenvoltmeter * Oszillograf * Testband...QZZCFM	1. Den Meßaufbau zeigt Fig. 8. 2. Standard-Frequenz (QZZCFM 315Hz) vom Testband wiedergeben und Ausgangsspannung messen. 3. Messung an beiden Kanälen durchführen. **NORMALWERT: Ungefär 0,7V** **Einstellung:** 1. Abweichungen können durch Abgleich von VR1 (linker Kanal) und VR2 (rechter Kanal) korrigiert werden. (S. Fig. 1). 2. Nach effolgtem Abgleich ist der Frequenzgang bei Wiedergabe erneut zu kontrollieren.
Ⓗ Vorspannungsverlust Bedingung: * Aufnahme * Eingangsregler...MAX. * Ausgangsregler...MAX. * Bandbetriebsarten: Metall Meßgerät: * Röhrenvoltmeter * Oszillograf	**Einstellung (zum Aufnahmeverstärker)** 1. Den Meßaufbau zeigt Fig. 14. 2. Gerät auf Aufnahme schalten. 3. Sperrkreisspulen L105 (Linker Kanal) und L106 (Rechter Kanal) so abgleichen daß der Meßwert minimal wird. **Einstellung (zum Wiedergabeverstärker)** 1. Den Meßaufbau zeight Fig. 15. 2. Auf Aufnahme schalten und den Monitor-Schalter auf „TAPE" stellen. 3. Die Filterspulen L1 (linker Kanal) und L2 rechter Kanal) so abgleichen, daß an LINE OUT der kleinste Wert gemessen wird.
Ⓘ Löschstrom Bedingung: * Aufnahme * Bandbetriebsarten: Normal CrO_2 Metall Meßgerät: * Röhrenvoltmeter * Oszillograf	1. Den Meßaufbau zeigt Fig. 16. 2. Betriebsart auf Aufnahme und Bandwahlschalter auf Metallposition stellen, dann Spannung an Prüfpunkt 7 messen. 3. Löschstrom nach folgender Formel emitteln: $\text{Löschstrom (A)} = \frac{\text{Die Spannung über beide Enden von R201}}{1(\Omega)}$ **NORMALWERT: 185** ± 10mA (Metal) 4. Abweichungen können durch Abgleich von VR203 korrigiert werden.
Ⓙ Gesamt-frequenzgang Bedingung: * Aufnahme und Wiedergabe * Bandbetriebsarten: Normal CrO_2 Metall * Eingangsregler...MAX. * Ausgangsregler...MAX.	**Anm.:** Vor Messung und Abgleich des Gesamtfrequenzganges ist sicherzustellen, daß der Frequenzgang bei Wiedergabe korrekt ist (Vgl. entspr. Abschnitt). Einstellung bei mittleren und hohen Frequenzbereichen unter Verwendung von Vormagnetisierungsstrom 1. Den Meßaufbau zeigt Fig. 17. 2. Testband elnlegen. 3. Den Monitor-Wahlschalter in die "source"-Position. 4. 1kHz vom NF-Generator über den Abschwächer dem NF-Eingang zuführen.

Gegenstand	Messung und Einstellung
Meßgerät: * Röhrenvoltmeter * NF-Generator * Abschwächer * Widerstand (600Ω) * Testband (Leerband) QZZCRA für Normal QZZCRX für CrO_2 QZZCRZ für Metal	5. Den Abschwächer so einstellen, daß der Eingangspegel (−20dB) des Stand-Aufnahmepegels berträge (Standard-Aufnahmepegel = Anzeige "0" des Pegel-Meters). 6. Zu diesem Zeitpunkt beträgt der Ausgangspegel 0,07V. 7. Den Monitor-Wahlschalter in die "tape"-Position stellen. 8. Die Aufnahme-und Wiedergabetaste drücken. 9. Tongenerator auf 1kHz, 40Hz, 200Hz, 4kHz, 8kHz und 14kHz und Ausgangspegel an LINE OUT ablesen. 10. Überprüfen, ob der Pegel jeder Frequenz in bezug auf 1kHz innerhalb der in Fig. 18 gezeigten Angabe liegt. Justierung Ⓐ: Wenn die kurve den vorgeschriebenen Gesamtfrequenzgangbereich (Fig. 18) überschreitet, wie in Fig. 19 gezeigt.: 1) Den Vormagnetisierungsstromdurch Drehen von VR 201 (linker Kanal) und VR 202 (rechter Kanal) erhöhen. (S. Fig. 1) 2) Die Schritte 8 und 10 zur überprüfung wiederholen. (Wenn die Kurve dabei innerhalb des vorgeschriebenen Bereichs liegy (Fig. 18) mit den Schritten 11, 12 und 13 weiterfahren. 3) Wenn die Kurve den vorgeschriebene Bereich (Fig. 18) noch immer überschreitet, den Vormagnetisierungsstrom weiter erhöhen, und die Schritte 8 und 10 wiederholen. Justierung Ⓑ: Wenn die kurve unter den vorgeschriebennen Bereich für den Gesamtfrequenzgang (Fig. 18) absinkt, wie in Fig. 20 gezeigt: 1) Den Vormagnetisierungsstrom durch Drehen von VR201 (linker Kanal) und VR202 (rechter Kanal) reduzieren. 2) Die Schritte 8 und 10 zur Überprüfung wiederholen. (Falls die Kurve dabei innerhalb des vorgeschriebenen Bereichs in Fig. 18 liegt, mit den Schritten 11, 12 und 13 weiterfahren.) 3) Falls die kurve noch immer unter den vorgeschriebenen Bereich (Fig. 18) absinkt, den Vormagnetisierungsstrom weiter reduzieren, und Schritte 8 und 10 wiederholen. 11. Gerät auf Betriebsart „CrO_2 band" schaltern. 12. Testband QZZCRX einlegen, und Signale von 50Hz, 100Hz, 200Hz, 500Hz, 1kHz, 4kHz, 8kHz, 10kHz und 16 kHz aufzeichnen. Anschließend die Signale wiedergeben und prüfen, ob die Kurve innerhalb des Bereichs im Gesamtfrequenzgangdiagramm für CrO_2-band liegt. (Fig. 21). 13. Gerät auf Betriebsart „Metalband" schalten. Test-band QZZCRZ einlegen und Signale von 50Hz, 100Hz, 200Hz, 500Hz, 1kHz, 4kHz, 8kHz, 10kHz und 16kHz aufnehmen. Anschließend die Signale wiedergeben und prüfen, ob die Kurve innerhalb des Bereichs im Gesamtfrequenzgangdiagramm für Metalband liegt. (Fig. 21). 14. Überprüfen, daß die Vormagnetisierungsströme ungefähr den folgenden Werten entsprechen, wenn der Betriebsart in die entsprechende Position gestellt ist. * Spannung vom Röhrenvoltmeter ablesen und Vormagnetisierungs-strom nach folgender Formel berechnen: Vormagnetisierungsstrom (A) = $\frac{\text{Spannung am Röhrenvoltmeter (V)}}{10\ (\Omega)}$ **NORMALWERT:** Ungefähr 0.7mA (Normal position) Ungefähr 1.0mA (CrO_2 position) Ungefähr 1.6mA (Metal position) : Gemessen an TP9 (L-CH) und TP8 (R-CH) **Einstellung bei hohen Frequenzbereichen mit der Entzerrrspule zur Aufnahmeentzerung** Verläuft der Frequenzgang bei mittleren Frequenzen flach und zeigt bei höheren Frequenzen einen scharfen Anstieg oder Abfall entsprechend Fig. 22 und Fig. 23, sind die folgenden Korrekturspulen zu erhöhen. L 103 (linker Kanal), L 104 (rechter Kanal)

Gegenstand	Messung und Einstellung
Meßgerät: * Röhrenvoltmeter * NF-Generator * Abschwächer * Widerstand (600Ω) * Testband (Leerband) QZZCRA für Normal QZZCRX für CrO_2 QZZCRZ für Metal	5. Den Abschwächer so einstellen, daß der Eingangspegel (−20dB) des Stand-Aufnahmepegels berträge (Standard-Aufnahmepegel = Anzeige "0" des Pegel-Meters). 6. Zu diesem Zeitpunkt beträgt der Ausgangspegel 0,07V. 7. Den Monitor-Wahlschalter in die "tape"-Position stellen. 8. Die Aufnahme-und Wiedergabetaste drücken. 9. Tongenerator auf 1kHz, 40Hz, 200Hz, 4kHz, 8kHz und 14kHz und Ausgangspegel an LINE OUT ablesen. 10. Überprüfen, ob der Pegel jeder Frequenz in bezug auf 1kHz innerhalb der in Fig. 18 gezeigten Angabe liegt. Justierung Ⓐ: Wenn die kurve den vorgeschriebenen Gesamtfrequenzgangbereich (Fig. 18) überschreitet, wie in Fig. 19 gezeigt.: 1) Den Vormagnetisierungsstromdurch Drehen von VR 201 (linker Kanal) und VR 202 (rechter Kanal) erhöhen. (S. Fig. 1) 2) Die Schritte 8 und 10 zur überprüfung wiederholen. (Wenn die Kurve dabei innerhalb des vorgeschriebenen Bereichs liegy (Fig. 18) mit den Schritten 11, 12 und 13 weiterfahren. 3) Wenn die Kurve den vorgeschriebene Bereich (Fig. 18) noch immer überschreitet, den Vormagnetisierungsstrom weiter erhöhen, und die Schritte 8 und 10 wiederholen. Justierung Ⓑ: Wenn die Kurve unter den vorgeschriebennen Bereich für den Gesamtfrequenzgang (Fig. 18) absinkt, wie in Fig. 20 gezeigt: 1) Den Vormagnetisierungsstrom durch Drehen von VR201 (linker Kanal) und VR202 (rechter Kanal) reduzieren. 2) Die Schritte 8 und 10 zur Überprüfung wiederholen. (Falls die Kurve dabei innerhalb des vorgeschriebenen Bereichs in Fig. 18 liegt, mit den Schritten 11, 12 und 13 weiterfahren.) 3) Falls die kurve noch immer unter den vorgeschriebenen Bereich (Fig. 18) absinkt, den Vormagnetisierungsstrom weiter reduzieren, und Schritte 8 und 10 wiederholen. 11. Gerät auf Betriebsart „CrO_2 band" schaltern. 12. Testband QZZCRX einlegen, und Signale von 50Hz, 100Hz, 200Hz, 500Hz, 1kHz, 4kHz, 8kHz, 10kHz und 16 kHz aufzeichnen. Anschließend die Signale wiedergeben und prüfen, ob die Kurve innerhalb des Bereichs im Gesamtfrequenzgangdiagramm für CrO_2-band liegt. (Fig. 21). 13. Gerät auf Betriebsart „Metalband" schalten. Test-band QZZCRZ einlegen und Signale von 50Hz, 100Hz, 200Hz, 500Hz, 1kHz, 4kHz, 8kHz, 10kHz und 16kHz aufnehmen. Anschließend die Signale wiedergeben und prüfen, ob die Kurve innerhalb des Bereichs im Gesamtfrequenzgangdiagramm für Metalband liegt. (Fig. 21). 14. Überprüfen, daß die Vormagnetisierungsströme ungefähr den folgenden Werten entsprechen, wenn der Betriebsart in die entsprechende Position gestellt ist. * Spannung vom Röhrenvoltmeter ablesen und Vormagnetisierungs-strom nach folgender Formel berechnen: Vormagnetisierungsstrom (A) = Spannung am Röhrenvoltmeter (V) / 10 (Ω) **NORMALWERT:** Ungefähr 0.7mA (Normal position) Ungefähr 1.0mA (CrO_2 position) Ungefähr 1.6mA (Metal position) : Gemessen an TP9 (L-CH) und TP8 (R-CH) **Einstellung bei hohen Frequenzbereichen mit der Entzerrrspule zur Aufnahmeentzerung** Verläuft der Frequenzgang bei mittleren Frequenzen flach und zeigt bei höheren Frequenzen einen scharfen Anstieg oder Abfall entsprechend Fig. 22 und Fig. 23, sind die folgenden Korrekturspulen zu erhöhen. L 103 (linker Kanal), L 104 (rechter Kanal)

Gegenstand	Messung und Einstellung
Ⓚ **Gesamt-Verstärkung** Bedingung: * Aufnahmekalibrierung...Mitte * Aufnahme und Wiedergabe * Bandbetriebsarten: Normal CrO_2 Metall * Eingangsregler...MAX. * Ausgangsregler...MAX. * Standard-Eingangspegel Mikrofon .....−72±3dB NF-Eingang .....−24±3dB Meßgerät: * Röhrenvoltmeter * NF-Generator * Abschwächer * Oszillograf * Testband (Leerband) QZZCRA für Normal QZZCRX für CrO_2 QZZCRZ für Metal	1. Den Meßaufbau zeight Fig. 24. 2. Testband (QZZCRA) in das Cassettenfach einsetzen. 3. Gerät auf „Aufnahme" und Bandbetreibsarten auf „Normal". 4. Über den Abschwächer 1kHz-Signal (−24dB) vom NF-Generator dem IN-Eingang zuführen. 5. ATT so justieren, daß Quellenmonitorpegel an LINE OUT 0,7V erreicht. 6. Dieses signal auf Testband aufnehmen. 7. Das aufgenommene Band abspielen und Ausgangspegel des Bandmonitors an LINE OUT auf VTVM messen. **NORMALWERT: Ungefähr 0,7V (Normal)** 8. Falls der gemessene Wert nicht der Toleranz liegt, die folgenden VR abgleichen. VR103 (L-CH), VR104 (R-CH). 9. Ab Punkt 4 wiederholen. 10. Den Bandsortenwähler in jede Position stellen. 11. Nacheinander das CrO_2 Testband (QZZCRX) und das Metallpartikel-Testband (QZZCRZ) benutzen. 12. Gerät auf Aufnahme schalten. 13. Die Aufnahme wiedergeben, und den Ausgangspegel an LINE OUT am Röhrenvoltmeter ablesen. **NORMALWERT: Ungefähr 0,7V (CrO_2) (Metal)** **Einstellung der Gesamtverstärkung mit Metall- und CrO_2-Bändern** * Einstellung der Gesamtverstärkung mit Metall- und Cro_2-Bändern muß nach der Einstellung einen normalen Bandes vorgenommen werden. * Einstellung der Gesamtverstärkung von Metall- und CrO_2-Bändern geschieht durch Unterbrechen oder kurzschließen der Anschlußpunkte für die Einstellung der Gesamtverstärkung auf der PCB. (Fig. 25). Die Gesamtverstärkung wird bei Kurzschließen um annähernd 0,6dB reduziert und steigt um annähernd 0,6dB bei Unterbrechen. Unterbrech- und Kurzschließbedingungen an den Anschlußpunkten variieren je nach Gerät aufgrund der vor der Verschiffung vorgenommenen Feineinstellungen. Falls Nachstellungen erforderlich sind, sollten die Ergebnisse den Standardwerten möglichst genau entsprechen.
Ⓛ **Fluorezenzmeter** Bedingung: * Aufnahme * Eingangsregler...MAX. * Ausgangsregler...MAX. Meßgerät: * Röhrenvoltmeter * NF-Generator * Abschwächer	1. Den Meßaufbau zeigt Fig. 24. 2. Wie in Fig. 25 gezeigt den Kollektor des Q302 an Masse anschließen. 3. Signal vor 1kHz (−24dB) an die Line IN-Buchse eingeben und Monitorschalter auf Quelle-Position stellen. 4. ATT so abstimmen, daß der Ausgangspegel an der LINE OUT-Buchse 0,7V wird. (Der Eingangspegel in dieser Stellung wird als Standardpegel bezeichnet). 5. Justierung auf "−20dB". A. Den Abschwächer so einstellen, daß der Eingangspegel −20dB des Stand-Aufnahmepegels beträge. B. VR301 so ableichen, daß im Bereich von −20dB±0,8dB das Segment −20dB aufleuchtet (NUR RECHTER KANAL) (S. Fig. 27). 6. Justierung auf "0dB". A. ATT so abstimmen, daß der Ausgangspegel an der LINE OUT-Buchse, 0,7V wird. B. VR302 so abgleichen, daß im Bereich von ±0,2dB um den Standardpegel das Segment 0dB aufleuchtet (S. Fig. 28). 7. Die Anleitungsschritte 5 bis 6 zweimal wiederholen. 8. Die ATT einstellen; kontrollieren, ob alle Segmente aufleuchten, wenn der Eingangspegel 10dB höher als der Standardpegel ist (S. Fig. 29).
Ⓜ **Dolby-Schaltung** Bedingung: * Aufnahme * Eingangsregler...MAX. * Ausgangsregler...MAX. Meßgerät: * Röhrevoltmeter * NV-Generator * Abschwächer * Oszillograf * Widerstand (600Ω)	**Aufnahmesseite** 1. Den Meßaufbau ziegt Fig. 30. 2. Gerät in Stellung „Aufnahme" betreiben und Dolby-Schalter ausschalten. Dem NF-Eingang ein 5kHz-Signal zuführen, daß an TP3 (Linker Kanal) und TP4 (Rechter Kanl) −34,5dB erhalten werden. 3. Prüfen, ob das Signal bei eingeschaltetem Dolby-Schalter um 8 (±2,5)dB größer ist als bei ausgeschaaltetem Dolby-Schalter. **Wiedergabeseite** 1. Den Meßaufbau zeigt Fig. 31. 2. Gerät in Stellung „Aufnahme" betreiben und Dolby-Schalter ausschalten. Dem NF-Eingang ein 5kHz-Signal zuführen, daß an TP 1 (Linker Kanal) und TP2 (Rechter Kanal) −34,5dB erhalten werden. 3. Prüfen, ob das Signal bei eingeschaltetem Dolby-Schalter um 8 (±2,5) kliner ist als bei ausgeschaltetem Dolby-Schalter.

DISASSEMBLY INSTRUCTIONS

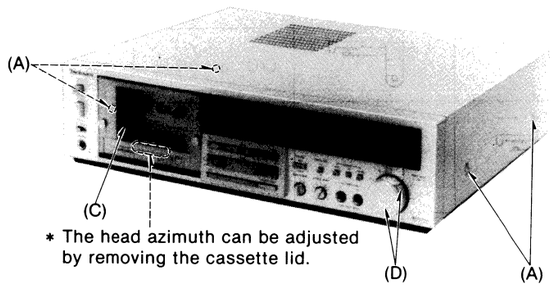


Fig. 1

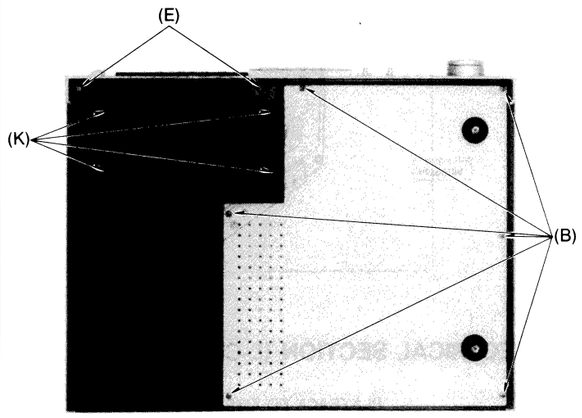


Fig. 2

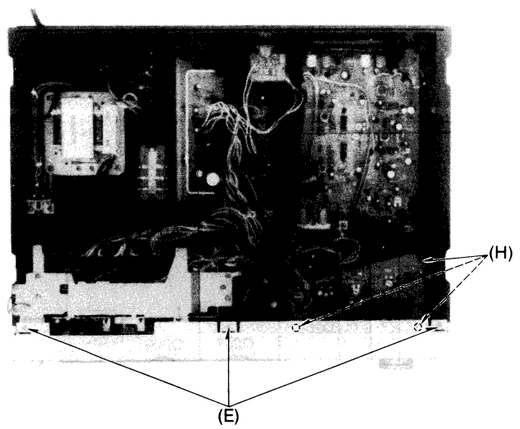


Fig. 3

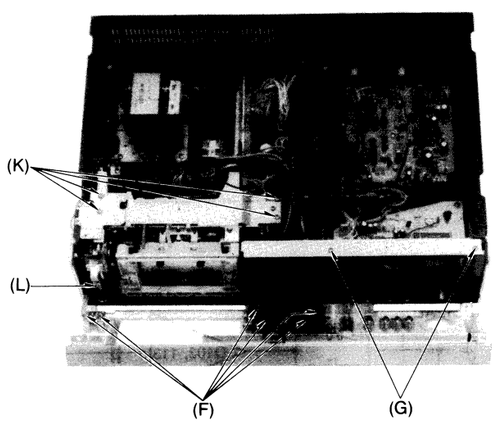


Fig. 4

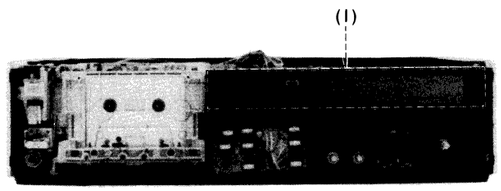


Fig. 5

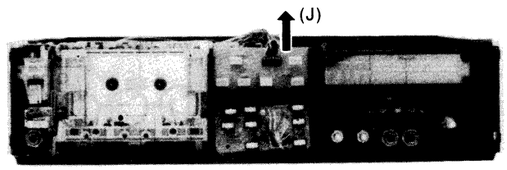


Fig. 6

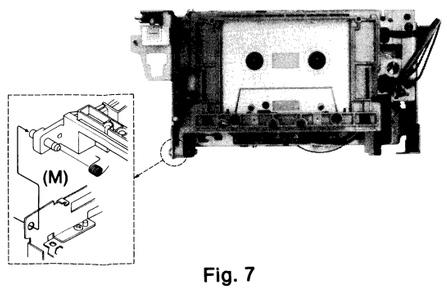


Fig. 7

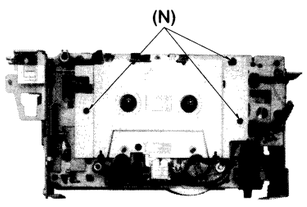


Fig. 8

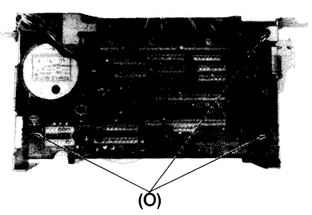
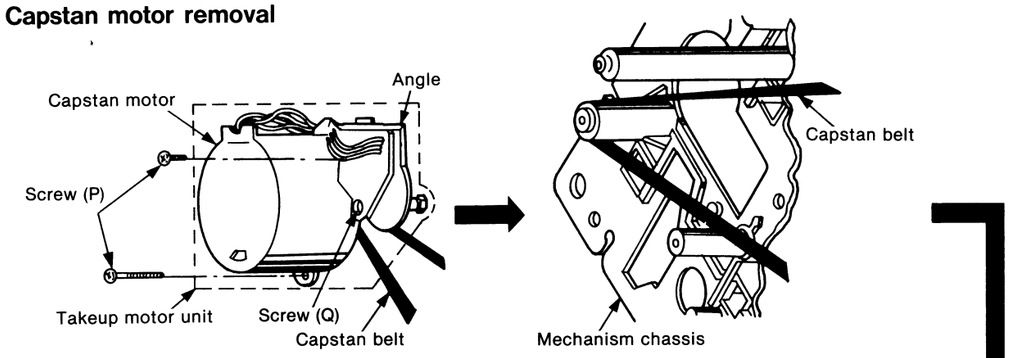


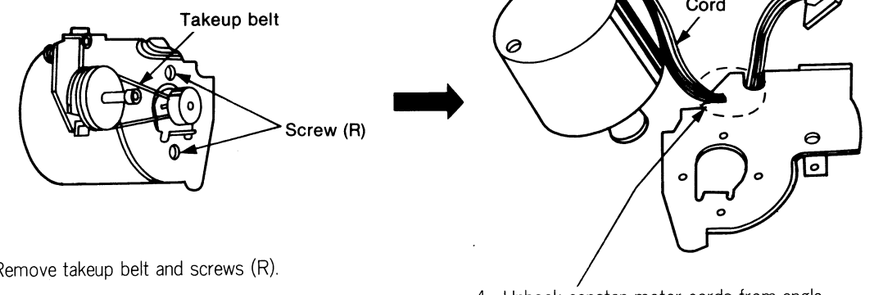
Fig. 9

Ref. No.	Procedure	To remove —— .	Remove —— .	Shown in fig. —— .
1	1	Case cover	• 4 screws ····· (A)	1
2	2	Bottom cover	• 6 screws ····· (B)	2
3	1→2→3	Front panel	• Cassette lid ····· (C) • 2 control knobs ····· (D) • 5 screws ····· (E) • 6 screws ····· (F)	1 1 2, 3 4
4	1→2→3→4	FL meter circuit board	• 2 screws ····· (G) • 3 screws ····· (H) • Meter cover and filter ····· (I)	4 3 5
5	1→2→3→4→5	Mode indicator circuit board	• Slide in direction of arrow ··· (J)	6
6	1→2→3→4→6	Mechanism unit	• 8 screws ····· (K) • Power button ····· (L)	2, 4 4
7	1→2→3→4→6→7	Cassette holder	• Slide in direction of arrow ··· (M)	7
8	1→2→3→4→6→7→8	Mechanism cover	• 3 screws ····· (N)	8
9	1→2→3→4→6→9	Main control circuit board	• 3 screws ····· (O)	9

Capstan motor removal



1. Remove screws (P) and capstan belt and then remove takeup motor unit from the mechanical unit.
2. Temporarity hook the unhooked capstan belt to the projection on the chassis as shown in the figure. (Be careful not to let grease adhere to the capstan belt.)



3. Remove takeup belt and screws (R).
4. Unhook capstan motor cords from angle.

CHIP PARTS REPAIR PROCEDURE

[MAIN CONTROL CIRCUIT BOARD]

(transistor, diode, resistor and capacitor, etc.)

A. Removal

1. Remove the solder from both ends of a chip using the solder sucker (RP8062).
2. While the soldering iron is attached to both ends of the chip, as shown in fig. 1, remove the chip by turning with tweezers.
   * Make sure that the unit is turned OFF when checking the resistance and polarity of a chip. If technician can not check individual parts then we won't be able to service unit, and we might have to change complate foil board.

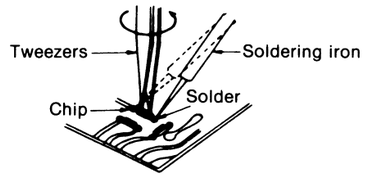


Fig. 1

B. Mounting

Place solder on the foil chip mounting, and solder the chip while applying the soldering iron in the direction of the arrow, as shown in fig. 2.

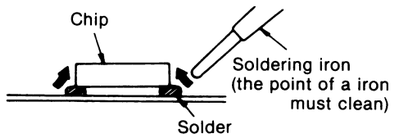


Fig. 2

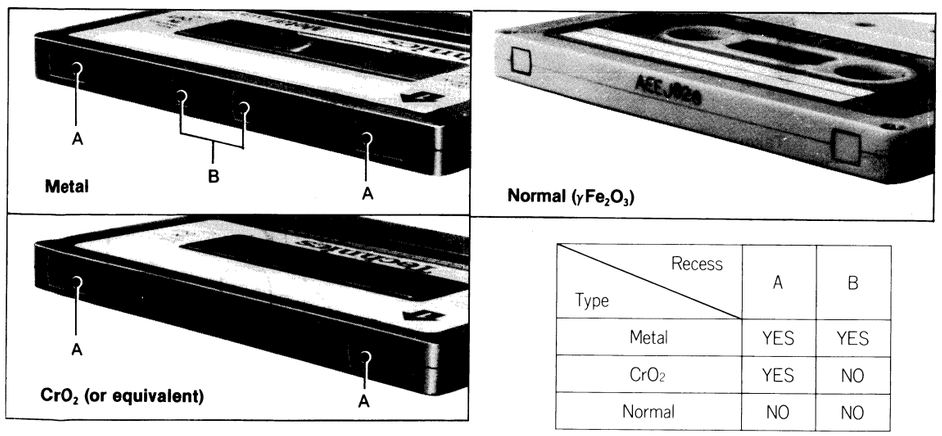
C. Precautions in mounting the chip

1. Do not heat the chip beyond 3 seconds.
2. Do not rub the electrode.
3. Use tweezers to prevent any damage to the surface.
4. It is recommended hat a pencil-type soldering iron be used.
5. Maintain temperature control under 260°C (500°F) when soldering.
   * Chip resistance (of not more than 100Ω) may vary greatly with the direction of mounting; therefore, mount the white side on the pattern side.
6. Do not re-use the tantalum capacitors or ceramic capacitors after removal (use new components).
7. Do not subject the components (chips) to excessive stress.

TECHNICAL EXPLANATION

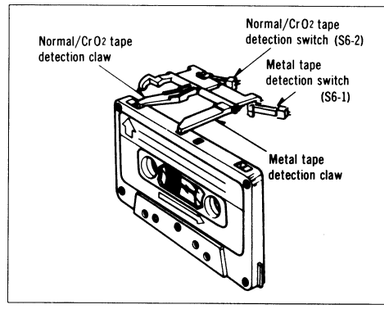
— AUTO TAPE SELECTOR —

This unit is equipped with an auto-tape selector system that detects these identification recesses and automatically selects the correct bias and equalization for Normal, CrO_2 and Metal tape varieties.
Thus, the novice user can obtain the correct tape selector setting automatically to ensure proper recording and playback results.



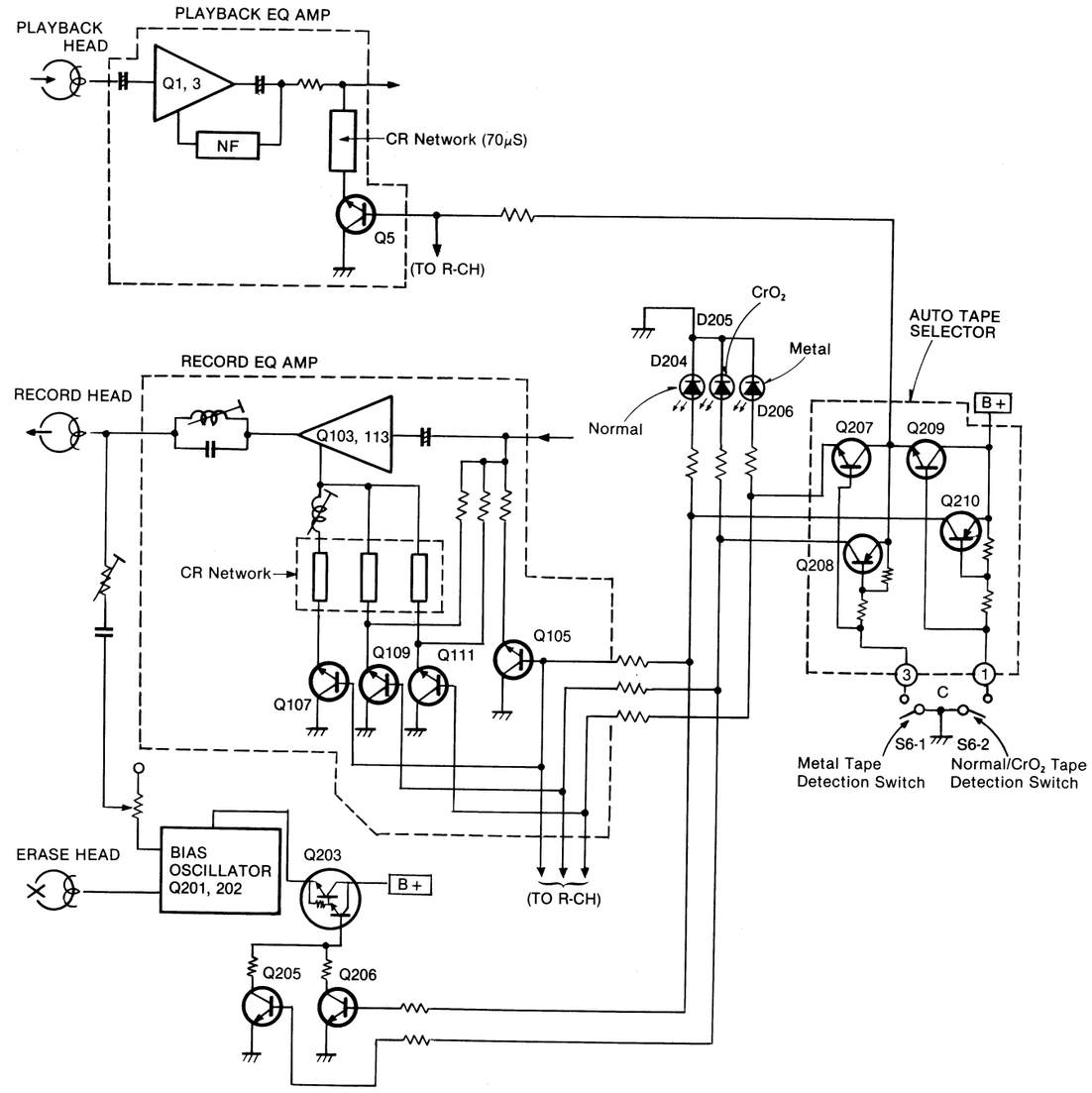
Type \ Recess	A	B
Metal	YES	YES
CrO_2	YES	NO
Normal	NO	NO

— MECHANICAL SECTION —


Normal/CrO2 tape detection claw
Normal/CrO2 tape detection switch (S6-2)
Metal tape detection switch (S6-1)
Metal tape detection claw

S6-1	S6-2	Mode
		Normal tape mode
		CrO_2 tape mode
		Metal tape mode

— ELECTRICAL SECTION (L-CH ONLY) —

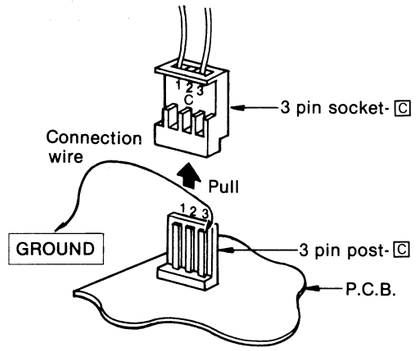


MEASUREMENT AND ADJUSTMENT METHODS

Tape selector (Tape mode switching)

For measurement adjustment with test tapes without tape detection holes (A and B), switch tape modes as follows.
(For normal tape mode, just insert a normal tape into the cassette holder.)

* Metal tape mode setting:
  Metal tape mode is obtained by disconnecting the 3 pin socket Ⓒ from the 3 pin post Ⓒ on the P.C.B. (Printed Circuit Board).
* CrO_2 tape mode setting:
  First, disconnect the 3 pin socket Ⓒ in the same way as above. Then, as illustrated in the figure right, connect the terminal-3 of the 3 pin post to the ground with a connection wire.



ADJUSTMENT PARTS LOCATION

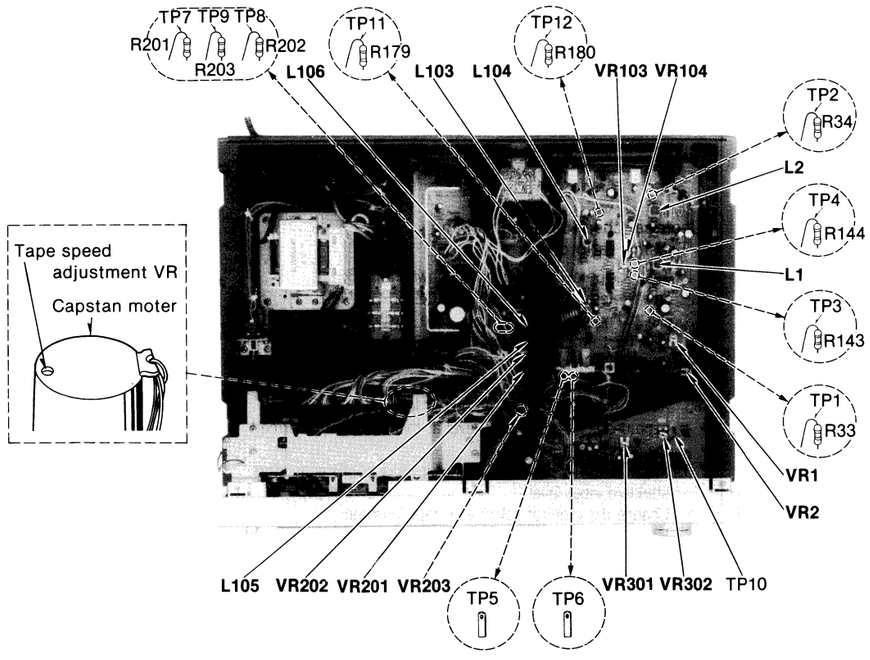
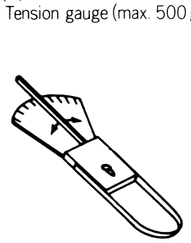
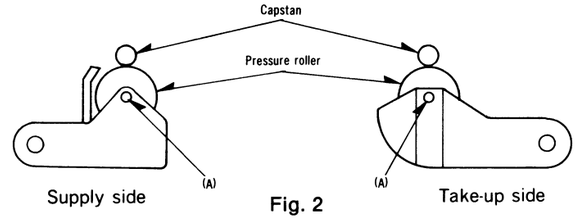
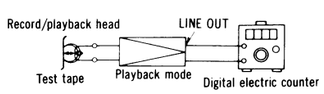
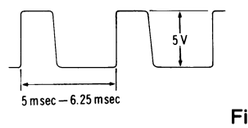
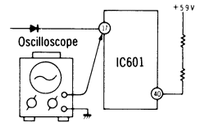
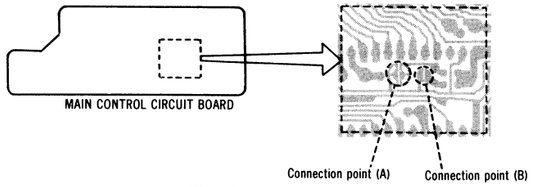
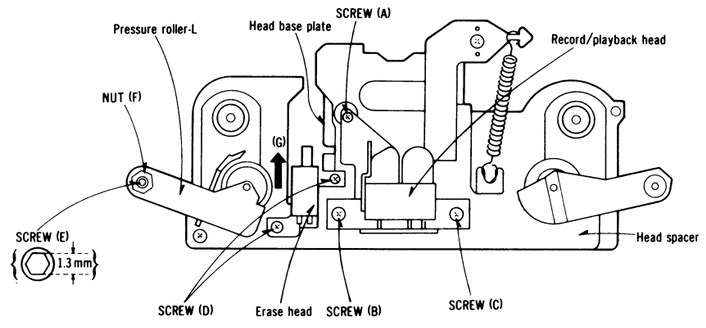
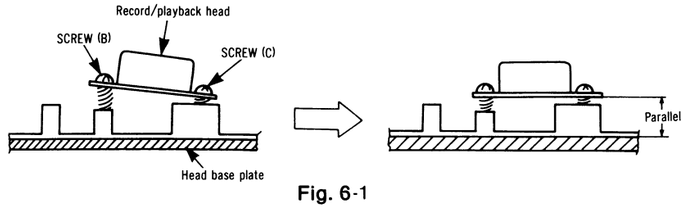


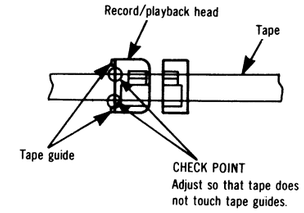
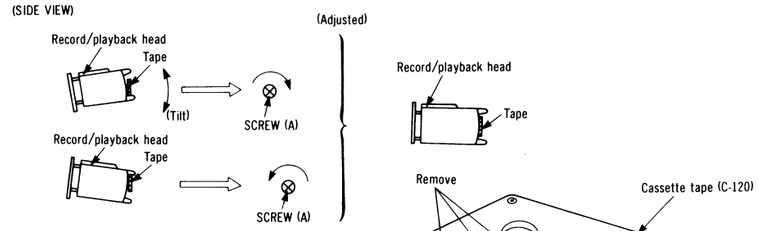
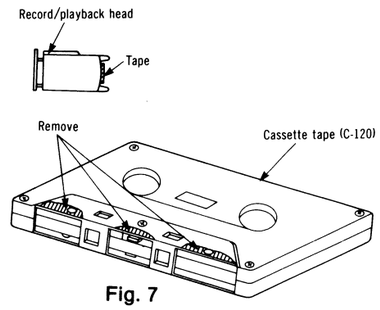
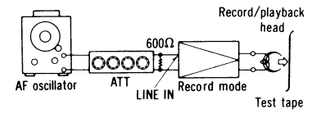
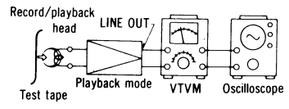
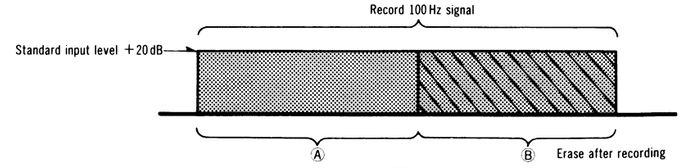
Fig. 1

NOTE: Set lever switches and controls in the following positions, unless otherwise specified.

- Make sure heads are clean.
- Make sure capstan and pressure roller are clean.
- Judgeable room temperature: 20±5°C (68±9°F).
- Monitor selector: Tape.
- Bias adjustment control: Center.
- Input level controls: Maximum.
- Output level control: Maximum.
- Dolby NR selector: Out.
- Input selector: Line.
- Timer selector: OFF.
- Menory selector: OFF.

ITEM	MEASUREMENT & ADJUSTMENT
Ⓐ Pressure of pressure roller Condition: * Playback mode Equipment: * Tension gauge (max. 500 gr)	1. Place UNIT into playback mode. 2. Hook tension gauge to pressure roller shaft top (A), and pull gauge in direction opposite to pressure of pressure roller against capstan (See fig. 2). 3. Read pressure indicated on gauge immediately when pressure roller moves away from capstan and stops rotating.   Fig. 2 Standard value: 130±20 gr Standard value: 350±50 gr
Ⓑ Takeup tension Condition: * Playback mode Equipment: * Cassette torque meter (QZZSRKCT)	1. Mount cassette torque meter on UNIT. 2. Place UNIT into playback mode. Standard value: 40^{+15}_{-10} gr-cm
Ⓒ Tape speed Condition: * Playback mode * Normal tape mode Equipment: * Digital electronic counter * Test tape ··· QZZCWAT	Tape speed accuracy 1. Test equipment connection is shown in fig. 3. 2. Playback test tape (QZZCWAT 3,000 Hz), and supply playback signal to frequency counter. 3. Take measurement at middle section of tape. 4. Measure this frequency. 5. On the basis of 3,000 Hz, determine value by following formula: $\text{Tape speed accuracy} = \frac{f-3{,}000}{3{,}000} \times 100\ (\%)$ where, f = measured value  Fig. 3 Standard value: ±1.5% Adjustment method 1. Playback the test tape (middle). 2. Adjust so that frequency becomes 3,000 Hz. 3. Tape speed adjustment VR shown in fig. 1. Tape speed fluctuation Make measurements in same manner as above (beginning, middle and end of tape), and determine the difference between maximum and minimum values and calculate as follows: $\text{Tape speed fluctuation} = \frac{f_1-f_2}{3{,}000} \times 1000\ (\%)$ f_1 = maximum value, f_2 = minimum value Standard value: Less than 1.0%
Ⓓ Input scanning time adjustment Condition: * Stop mode Equipment: * Oscilloscope	1. Connect oscilloscope to ⑰ terminal of IC601. 2. Measure the time of input scanning signal with oscilloscope as shown in fig. 4. Standard value: 5 msec — 6.25 msec 3. If the measured value is markedly different from the signal shown below, make the necessary adjustment as follows.   Fig. 4

ITEM	MEASUREMENT & ADJUSTMENT
	Adjustment 1. Open the point (B) and short the point (A) on the main circuit board in the circuit board diagram (See fig. 5). 2. Make measurement for wave form. 3. Make sure that the measured value is within 5 msec to 6.25 msec. 4. If it is beyond the value, carry out the following adjustments: • If the measured value is less than 5 msec, short the point (B). • If the measured value is more than 6.25 msec, open the point (A).  **Fig. 5**
Ⓔ Head alignment and tape running adjustment Condition: * Record/playback mode Equipment: * VTVM * Oscilloscope * AF oscillator * Resistor (600Ω) * Test tape ··· QZZCRD (Tape path viewer with mirror) * Test tape ··· QZZCFM (azimuth) * Cassette tape ··· C-120	This unit uses our exclusive 2-motor double-capstan system for improved basic performance. Consequently, tape running accuracy is extremely high. When servicing this unit (especially, adjustments after replacement of combination head or pressure roller-L), carefully follow the procedures described below to maintain specified performance. **Precautions** * Do not adjust pressure roller-L (supply side) except when absolutely necessary, since it provides the reference for height adjustments of record/playback and erase heads. * When replacing both the record/playback head and pressure roller-L, replace and adjust the record/playback head before replacing and adjusting pressure roller-L. (If both are replaced simultaneously, adjustment becomes extremely difficult since no reference is available for tape running height). **a) Record/playback head adjustment**  **Fig. 6** **Rough adjustment** 1. Turn screws (A) and (B) completely clockwise. 2. Return screw (A) by one turn and screw (C) by four turns. 3. Adjust screw (B) so that the head is parallel to the head base plate. (fig. 6-1).  **Fig. 6-1**

ITEM	MEASUREMENT & ADJUSTMENT
	Fine adjustment **— Height adjustment —** 1. Load QZZCRD (tape path viewer) and set the unit to pause mode. Fine-adjust screws (B) and (C) (fig. 6-2). **— Tilt adjustment —** 1. Run the tape by setting the unit to playback mode and adjust screw (A) so that tape does not curl or deform. (Tape running is adversely influenced if screw (A) is displaced by more than 1/2 turn from the optimum position. Adjust carefully and accurately.) 2. Replace QZZCRD with C-120 (RT-120LN, etc.), and check tape running (fig. 7). Fine-adjust screw (A) if tape curls or deforms during tape run.  **Fig. 6-2** ● Adjustment direction of screw A  **Fig. 6-3**  **Fig. 7** **Electrical check on tape running** **— Erasing ratio check —** 1. Test equipment connection is shown in fig. 8. 2. Load reference blank test tape (QZZCRZ) (Metal tape). 3. Set the monitor selector to source position and the tape selector to metal position. 4. Supply 100 Hz signal from AF oscillator through ATT to LINE IN. 5. Adjust the ATT so that the output level at LINE OUT becomes 0.7 V (The input level at this condition is termed the standard input level). 6. Adjust the ATT so that the input level is 20 dB above the standard input level. 7. Change the monitor selector to tape position. 8. Press the record and playback buttons. 9. After recording, erase portion Ⓑ by setting the input level controls to minimum under a no-signal condition (Shown in fig. 9).   **Fig. 8**  **Fig. 9** 10. Playback portions Ⓐ and Ⓑ, and measure output levels (dB) at LINE OUT. 11. Perform measurements for both channels. Erasing ratio (dB) = Measured value of portion Ⓐ − Measure value of portion Ⓑ Reference value: Greater than 58 dB

ITEM	MEASUREMENT & ADJUSTMENT

— 8kHz playback output confirmation —

1. Make connections as shown in fig. 10.

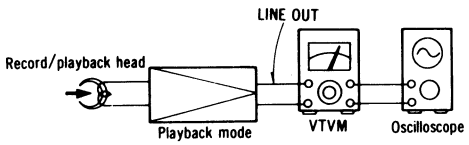


Fig. 10

2. After azimuth adjustment described below, playback test tape (QZZCFM) 8kHz signal and measure LINE OUT output.
3. Make measurements for both channels.

Reference value: Greater than 60mV

4. Fine-adjust screw (A) if the erasing ratio and playback output are out of the reference value (Refer to the tilt adjustment).

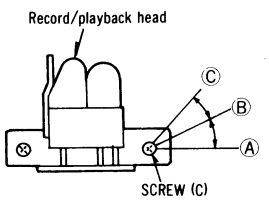


Fig. 11

Head azimuth adjustment

L-CH/R-CH output balance adjustment

1. Make connections as shown in fig. 10.
2. Playback the 8kHz signal from the test tape (QZZCFM). Adjust screw (C) in fig. 11 for maximum output L-CH and R-CH levels.
   When the output levels of L-CH and R-CH are not at maximum at the same time, readjust as follows.
3. Turn the screw shown in fig. 11 to find angles Ⓐ and Ⓒ (points where peak output levels for left and right channels are obtained). Then, locate the angle Ⓑ between angles Ⓐ and Ⓒ, i. e., a point where L-CH and R-CH output levels come together at maximum (Refer to figs. 11 and 11-1).

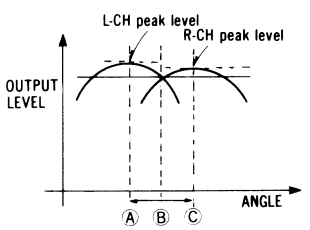


Fig. 11-1

L-CH/R-CH phase adjustment

4. Make connections as shown in fig. 11-2.
5. Playback the 8kHz signal from the test tape (QZZCFM). Adjust screw (C) shown in fig. 11 so that pointers of the two VTVMs swing to maximum and a waveform as illustrated in fig. 11-3 is obtained on the oscilloscope.
6. After adjustment, lock head adjust screw with lacquer.

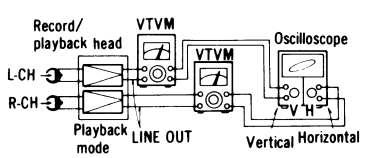


Fig. 11-2

b) Erase head adjustment

1. Loosen erase head screw (D), and raise the erase head to the maximum in the direction of arrow (G) (fig. 6).
2. Check that the erase head does not contact the cassette half in playback mode.

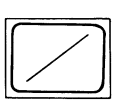


Fig. 11-3

c) Pressure roller-L (supply side) adjustment

1. Loosen screw (E) and adjust nut (F) vertical position to prevent tape from being curled or malformed during tape travel (See fig. 6).

Ⓕ Playback frequency response

Condition:
- * Playback mode
- * Normal tape mode
- * Output level control ··· MAX

Equipment:
- * VTVM * Oscilloscope
- * Test tape ··· QZZCFM

Measurement

1. Test equipment connection is shown in fig. 8.
2. Place UNIT into playback mode.
3. Playback the frequency response test tape (QZZCFM).
4. Measure output level at 315Hz, 12.5kHz, 8kHz, 4kHz, 1kHz, 250Hz, 125Hz and 63Hz and compare each output level with the standard frequency 315Hz, at LINE OUT.

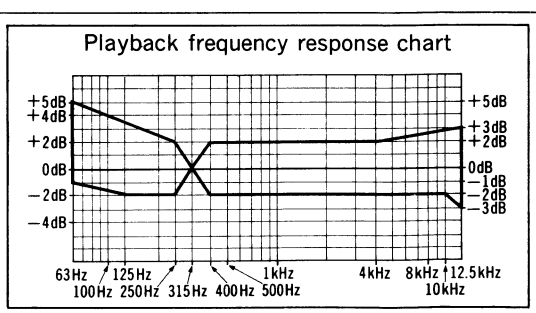


Fig. 12

5. Make measurement for both channels.
6. Make sure that the measured value is within the range specified in the frequency response chart (fig. 12).

ITEM	MEASUREMENT & ADJUSTMENT

Playback frequency response adjustment

1. Open or short the circuit's connection points to adjust playback frequency response (see fig. 13).
2. The frequency response when connection points (a) (L-CH) and (a') (R-CH) are shorted and connection points (b) (L-CH) and (b') (R-CH) are open, changes as short/open condition at connection points changes as described below(table 1)
   Short/open conditions, in turn, differ with sets due to the differences in fine adjustments made prior to shipping. If readjustments are required, set conditions so that results are as close to the standard value as possible.

Connection point		4kHz	6kHz	8kHz	10kHz	12.5kHz
(a) (L-CH) (a') (R-CH)	(b) (L-CH) (b') (R-CH)					
Short	Short	around +0.2dB	around 0.5dB	around 0.7dB	around 0.8dB	around 0.9dB
Open	Short	around −0.2dB	around −0.6dB	around −0.8dB	around −1.2dB	around −2.0dB

Table 1

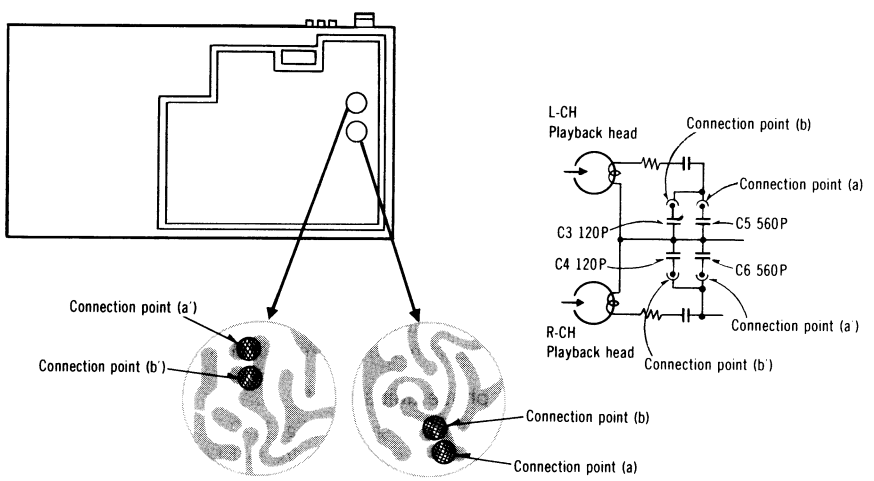


Fig. 13

Ⓖ Playback gain

Condition:
- * Playback mode
- * Output level control ··· MAX

Equipment:
- * VTVM * Oscilloscope
- * Test tape ··· QZZCFM

1. Test equipment connection is shown in fig. 8.
2. Playback standard recording level portion on test tape (QZZCFM 315Hz) and, using VTVM, measure the output level at LINE OUT jack.
3. Make measurement for both channels.

Standard value: around 0.7V

Adjustment

1. If measured value is not standard, adjust VR1 (L-CH), VR2 (R-CH) (See fig. 1).
2. After adjustment, check "Playback frequency response" again.

Ⓗ Bias leakage

Condition:
- * Record mode
- * Input level controls ··· MAX
- * Output level control ··· MAX
- * Metal tape mode

Equipment:
- * VTVM * Oscilloscope

Adjustment (For record amp)

1. Test equipment connection is shown in fig. 14.
2. Place UNIT into record mode.
3. Adjust trap coils L105 (L-CH), L106 (R-CH), so that measured value becomes minimum.

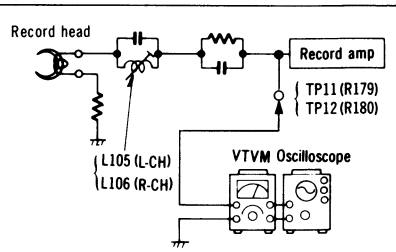
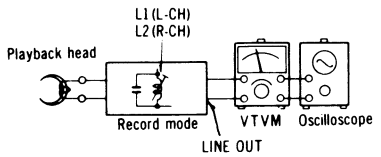
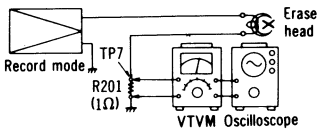
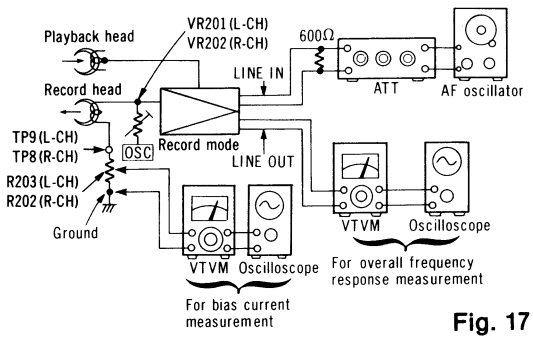
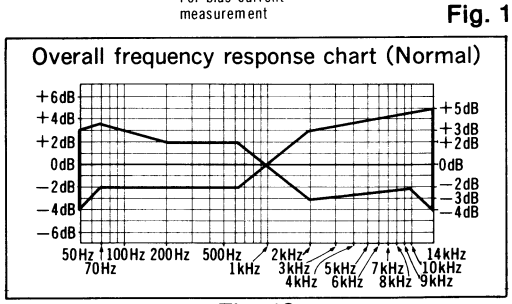
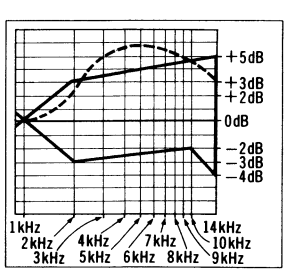
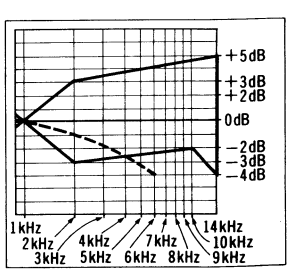


Fig. 14

ITEM	MEASUREMENT & ADJUSTMENT
	Adjustment (For playback amp) 1. Test equipment connection is shown in fig. 15. 2. Turn the UNIT into record mode and set the monitor selector to tape position. 3. Adjust trap coils L1 (L-CH) and L2 (R-CH), so that measured values are minimized at LINE OUT.  **Fig. 15**
❶ Erase current Condition: * Record mode * Normal tape mode * CrO_2 tape mode * Metal tape mode Equipment: * VTVM * Oscilloscope	1. Test equipment connection is shown in fig. 16. 2. Place UNIT into record mode and tape selector to metal position and then measure voltage at test point 7. 3. Determine erase current with the following formula: $\text{Erase current (A)} = \frac{\text{Voltage across both ends of R201}}{1\ (\Omega)}$ **Standard value: 185 ±10mA (Metal)**  **Fig. 16** 4. If measured value is not within standard adjust VR203.
❷ Overall frequency response Condition: * Record/playback mode * Normal tape mode * CrO_2 tape mode * Metal tape mode * Input level controls ··· MAX * Output level control ··· MAX Equipment: * VTVM * AF oscillator * ATT * Resistor (600Ω) * Test tape (reference blank tape) ··· QZZCRA for Normal ··· QZZCRX for CrO_2 ··· QZZCRZ for Metal	**Note:** Before measuring and adjusting, make sure of the playback frequency response (For the method of measurement, please refer to the playback frequency response). **Adjustment at middle and high frequency range: Using bias current**  **Fig. 17** 1. Test equipment connection is shown in fig. 17. 2. Load reference blank test tape. 3. Set the monitor selector to "source" position. 4. Supply 1 kHz signal from AF oscillator through ATT to LINE IN. 5. Adjust ATT so that input level is −20 dB below standard recording level (standard recording level = 0 VU). 6. At this time, LINE OUT level indicates 0.07 V. 7. Change the monitor selector to "tape" position. 8. Press the record and playback buttons. 9. Switch AF oscillator setting to 1 kHz, 40 Hz, 200 Hz, 4 kHz, 8 kHz and 14 kHz and read LINE OUT output levels. 10. Make sure that level of each frequency is within the specification described in fig. 18 based on a reference of 1 kHz.  **Fig. 18** **Adjustment Ⓐ:** When the curve exceeds the overall frequency response chart specifications (fig. 18) as shown in fig. 19.  **Fig. 19** **Adjustment Ⓑ:** When the curve falls below the overall frequency response chart specifications (fig. 18) as shown in fig. 20.  **Fig. 20**

ITEM	MEASUREMENT & ADJUSTMENT

1) Increase bias current by turning VR201 (L-CH) and VR202 (R-CH).
(See fig. 1 on page 4.)
2) Repeat steps 8 and 10 to confirm.
(Proceed to steps 11, 12 and 13 if the curve is now within the charted specifications in fig. 18.)
3) If the curve still exceeds the specifications (fig. 18), increase bias current further and repeat steps 8, 9 and 10.

1) Reduce bias current by turning VR201 (L-CH) and VR202 (R-CH).
2) Repeat steps 8 and 10 to confirm.
(Proceed to steps 11, 12 and 13 if the curve is now within the charted specifications in fig. 18.)
3) If the curve still falls below the charted specifications (fig. 18), reduce bias current further and repeat steps 8, 9 and 10.

11. Place UNIT into CrO_2 tape mode.
12. Change test tape to QZZCRX, and record 50 Hz, 100 Hz, 200 Hz, 500 Hz, 1 kHz, 4 kHz, 8 kHz, 10 kHz and 16 kHz signals. Then, playback the signals and check if the curve is within the limits shown in the overall frequency response chart for CrO_2 tapes (fig. 21).
13. Place UNIT into metal tape mode change test tape to QZZCRZ, and record 50 Hz, 100 Hz, 200 Hz, 500 Hz, 1 kHz, 4 kHz, 8 kHz, 10 kHz, 12.5 kHz and 16 kHz signals. Then, playback the signals and check if the curve is within the limits shown in the overall frequency response chart for metal tapes (fig. 21).

Overall frequency response chart (CrO_2, Metal)

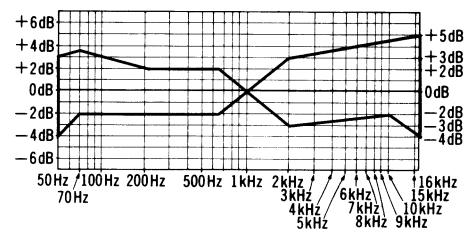


Fig. 21

14. Confirm that bias currents are approximately as follows when the UNIT is set at different tape mode.
* Read voltage on VTVM and calculate bias current by following formula:

$$\text{Bias current (A)} = \frac{\text{Value read on VTVM (V)}}{10\ (\Omega)}$$

Standard value:
around 0.7 mA (Normal position)
around 1.0 mA (CrO_2 position)
around 1.6 mA (Metal position)
} : measured at TP9 (L-CH) and TP8 (R-CH)

Adjustment at high frequency range: Using the peaking coil for recording equalization

When the frequency response is flat in the middle frequency range and makes a sharp rise or drop in the high frequency range, as shown in fig. 22 and fig. 23, adjust by turning the following peaking coils L103 (L-CH), L104 (R-CH).

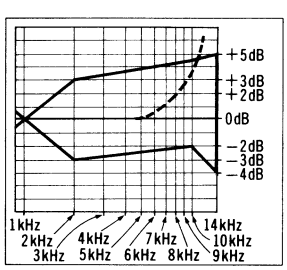


Fig. 22

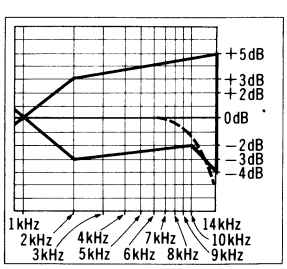


Fig. 23

K Overall gain

Condition:
* Recording calibration ··· center
* Record/playback mode
* Normal tape mode
* CrO_2 tape mode
* Metal tape mode
* Input level controls ··· MAX
* Output level control ··· MAX

1. Test equipment connection is shown in fig. 24.
2. Place the test tape (QZZCRA) in the cassette holder.
3. Place UNIT into record mode and normal tape mode.

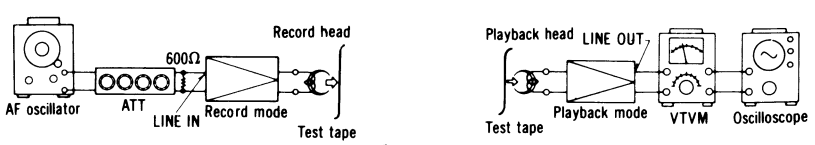
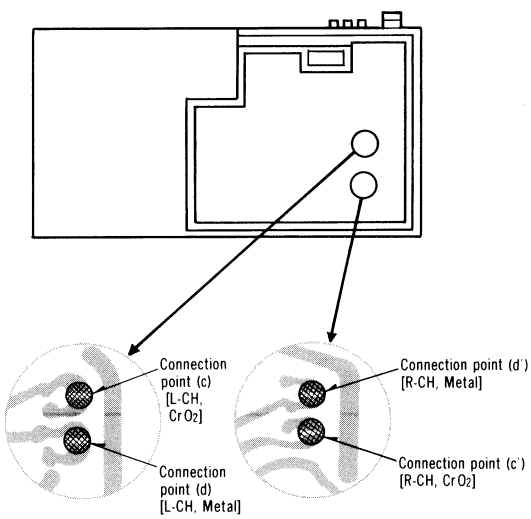
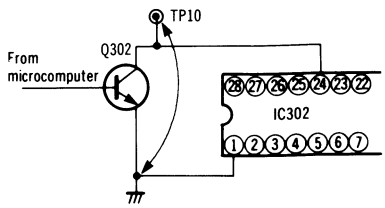
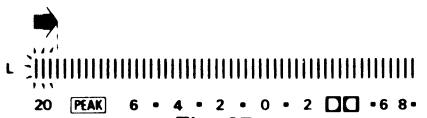
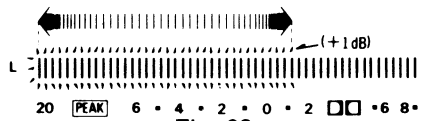
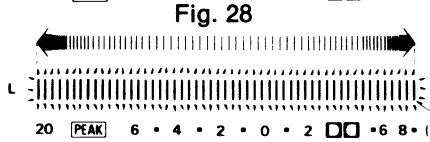
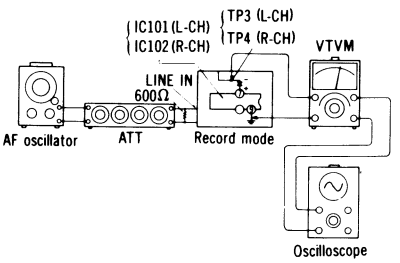
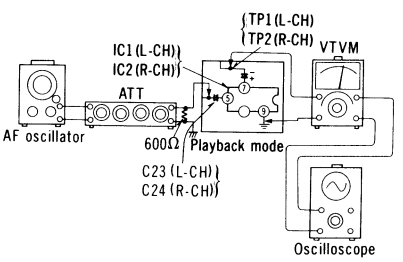


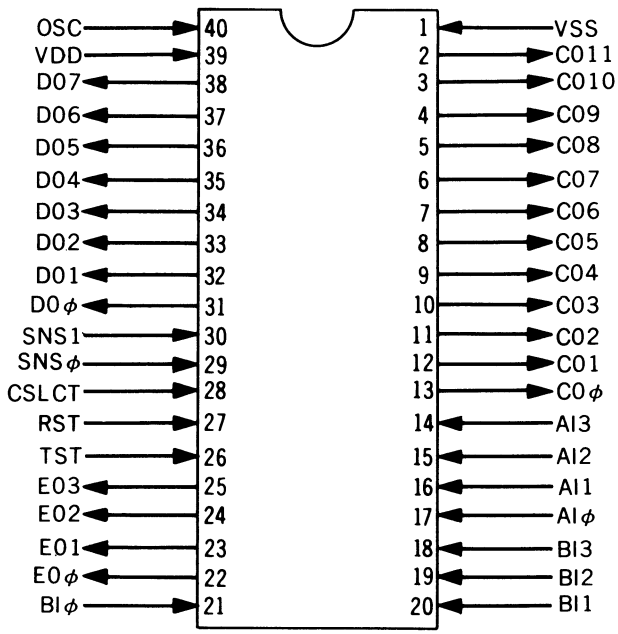
Fig. 24

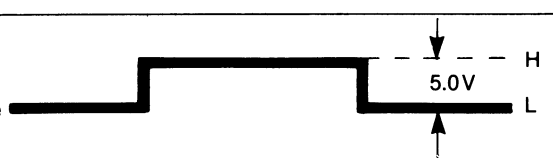
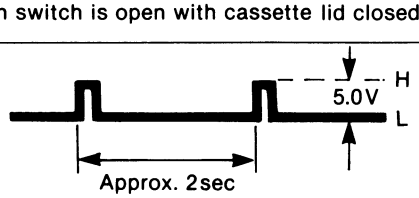
ITEM	MEASUREMENT & ADJUSTMENT
* Standard input level: MIC ····· −72 ± 3 dB LINE IN ··· −24 ± 3 dB Equipment: * VTVM * AF oscillator * ATT * Oscilloscope * Test tape (reference blank tape) ··· QZZCRA for Normal ··· QZZCRY for CrO_2 ··· QZZCRZ for Metal	4. Supply 1 kHz signal (−24 dB) from AF oscillator, through ATT to LINE IN. 5. Adjust ATT until source monitor level at LINE OUT becomes 0.7 V. 6. Using test tape, make recording. 7. Playback recorded tape, and measure the tape monitor output level at LINE OUT on VTVM. **Standard value: around 0.7 V(Normal)** 8. If measured value is not within standard, adjust VR103 (L-CH), VR104 (R-CH). 9. Repeat from step (4). 10. Place UNIT into each tape mode. 11. Change test tape to CrO_2 (QZZCRX) and Metal (QZZCRZ). 12. Place UNIT into record mode. 13. Playback recorded tape, and measure the output level at LINE OUT on VTVM. **Standard value: around 0.7 V (CrO_2 and Metal)** **Overall gain adjustment with metal and CrO_2 tapes** 1. Overall gain adjustment with metal and CrO_2 tapes must be done after setting overall gain with normal tape. 2. Overall gain adjustment with metal and CrO_2 tapes is done by opening and shorting connection points for overall gain adjustment on the printed circuit board (fig. 25). Overall gain is reduced by approximately 0.6 dB when shorted connection points are opened. Open/short condition at connection points differ with set due to the differences in fine adjustments made prior to shipping. If readjustments are required, set conditions so that results are as close to the standard value as possible.  **Fig. 25**
Ⓛ Fluorescent meter Condition: * Record mode * Input level controls ··· MAX * Output level control ··· MAX Equipment: * VTVM * AF oscillator * ATT	1. Test equipment connection is shown in fig. 24. 2. As shown in fig. 26, connect the collector of Q302 and ground. 3. Supply 1 kHz signal (−24 dB) to the LINE IN jack, then set the monitor switch to source position. 4. Adjust the ATT so that the output level at LINE OUT jack becomes 0.7 V (The input level at this condition is termed the standard input level). 5. Adjustment at "−20 dB". A. Adjust the ATT so that input level is −20 dB below standard recording level. B. Adjust VR301 so that the −20 dB segment lights up in the −20 dB ± 0.8 dB range (R-CH ONLY) (See fig. 27).  **Fig. 26**

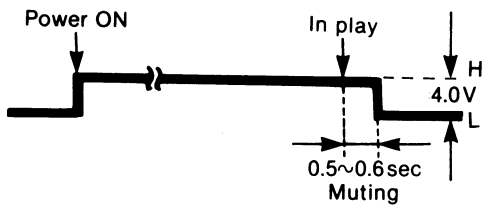
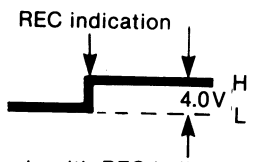
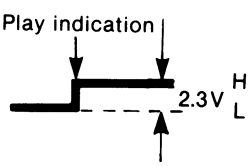
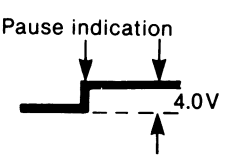
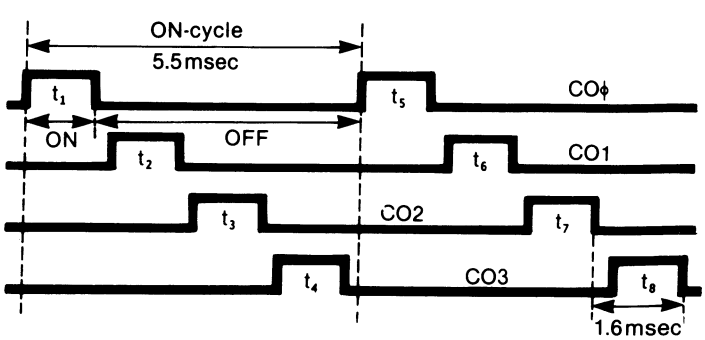
ITEM	MEASUREMENT & ADJUSTMENT
	6. Adjustment at "0 dB". A. Adjust the ATT so that the output level at LINE OUT jack becomes 0.7 V. (The input level at this condition is termed the standard input level.) B. Adjust VR302 so that the 0 dB segment lights up in the 0 ± 0.2 dB range of the standard input level (See fig. 28). 7. Repet twice between steps 5 and 6 above. 8. Adjust ATT and check that all segments light up when an input signal level is increased to 10 dB higher than the standard input level(See fig. 29).  Fig. 27  Fig. 28  Fig. 29
Ⓜ Dolby NR circuit Condition: * Record mode * Input level controls ··· MAX * Output level control ··· MAX Equipment: * VTVM * AF oscillator * ATT * Oscilloscope * Resistor (600Ω)	Record side 1. Test equipment connection is shown in fig. 30. 2. Place UNIT into record mode, set the Dolby NR switch to OUT position and supply to LINE IN to obtain −34.5 dB at TP3 (L-CH), TP4 (R-CH) (frequency 5 kHz). 3. Confirm that the value at IN position is 8 (±2.5) dB greater than the value at OUT position of Dolby NR switch.  Fig. 30 Playback side 1. Test equipment connection is shown in fig. 31. 2. Place UNIT into record mode, set the Dolby NR switch to OUT position and supply to LINE IN to obtain −34.5 dB at TP1 (L-CH), TP2 (R-CH) (frequency 5 kHz). 3. Confirm that the value at IN position is 8 (±2.5) dB less than the value at OUT position of Dolby NR switch.  Fig. 31

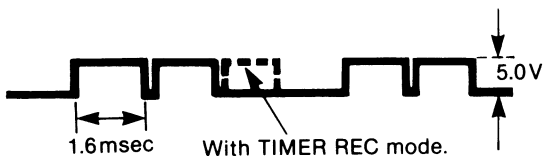
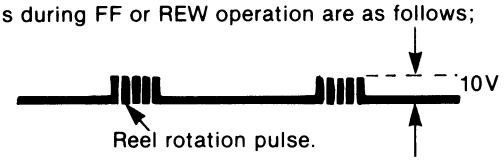
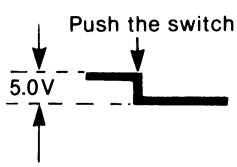
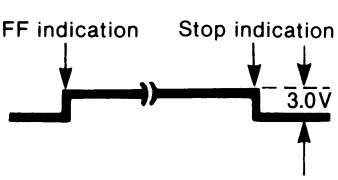
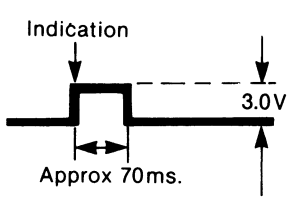
MN1400RZ (IC601) EACH TERMINAL FUNCTION AND WAVEFORM

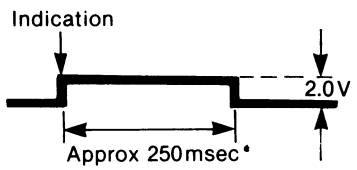
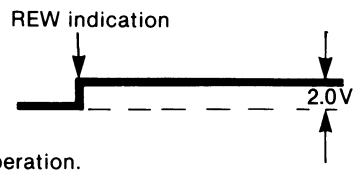
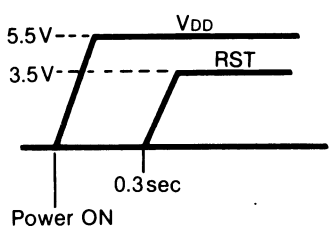
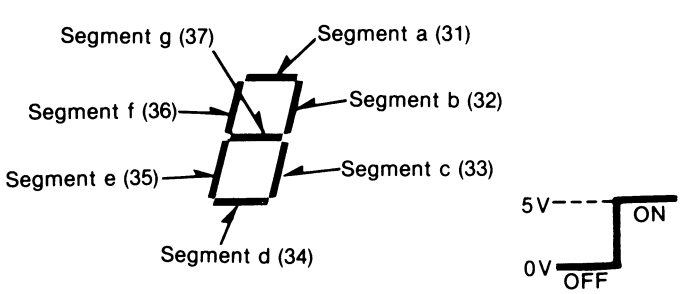
(BOTTOM VIEW)

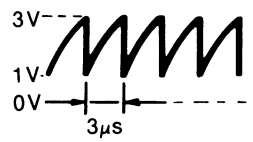


Terminal No.	Symbol	Name	Function/operation
1.	VSS	GND	
2.	CO11	Half SW OUT	Open / Close  It is interlocked with cassette half detection switch (Cassette half detection switch is open with cassette lid closed.)
3.	CO10	FL meter reset	 This output is for resetting the Peak Hold of the FL Meter. The pulse 2.5msec. width is transmitted in approx. 2-second cycles, regardless of the mechanism operation.
4.	CO9	No connection	Not used.
5.	CO8	No connection	Not used.

Terminal No.	Symbol	Name	Function/operation
6.	CO7	Muting	 "L" level 0.5 to 0.6 second after "PLAY" finish. "H" level in PAUSE, FF, REW STOP. "L" level approx. 0.3 second after "REC PAUSE" is switched to REC. "L" level approx. 0.3 second after command in case PAUSE mode is set to REC command.
7.	CO6	REC indication	 "H" level simultaneously with REC indication. "H" level immediately after power is ON in TIMER REC mode. "H" level held if in TIMER REC position, when STOP AUTO RESET mechanism operates.
8.	CO5	PLAY indication	 "H" level simultaneously with PLAY indication. Same as the above for TIMER PLAY and STOP AUTO RESET.
9.	CO4	PAUSE indication	 "H" level simultaneously with PAUSE indication.
10. 11. 12. 13.	CO3 CO2 CO1 COϕ	FL grid & input SW. scan FL grid & input SW. scan FL grid & input SW. scan FL grid & input SW. scan	

Terminal No.	Symbol	Name	Function/operation
14. 15. 16. 17.	Ai3 Ai2 Ai1 Aiϕ	Input SW read Input SW read Input SW read Input SW read	Each switch is read in accordance with the scans of COϕ to 3. STOP SW, MEMORY STOP, TIMER REC and COUNTER RESET are connected to Aiϕ. If only STOP SW and MEMORY STOP are closed, their waveforms are as follows;  HALF SW and HALL IC output are connected to Ai3. The waveforms during FF or REW operation are as follows; 
18. 19. 20. 21. 29. 30	Bi3 Bi2 Bi1 Biϕ SNSϕ SNS1	REW key FF key PLAY key STOP key REC key PAUSE key	 "H" in the normal case, "L" when the switch is pushed.
22.	EOϕ	Brake plunger	 "H" during FF/REW operations.
23.	EO1	Trigger plunger	 "H" until MODE SW is closed after the input to switch the mechanism, such as PLAY, PAUSE, STOP, etc. has been applied. (Approx. 70ms. depending on the mechanism condition.)

Terminal No.	Symbol	Name	Function/operation
24.	EO2	Motor CL	 "H" until MODE SW is changed from "close" to "open" following the indication that the mechanism mode has been changed.  "H" in REW operation.
25.	EO3	Motor UNCL	Same as the above in MODE conversion. "H" during FF.
26.	TST	Chip test	Connected to GND.
27.	RST	RESET	Computer's RESET terminal. Reset is less than 0.8V. 
28.	CSLCT	CSLCT	Connected to VDD.
31.	DOϕ	FL counter Segment a	
32.	DO1	FL counter Segment b	
33.	DO2	FL counter Segment c	
34.	DO3	FL counter Segment d	
35.	DO4	FL counter Segment e	
36.	DO5	FL counter Segment f	
37.	DO6	FL counter Segment g	

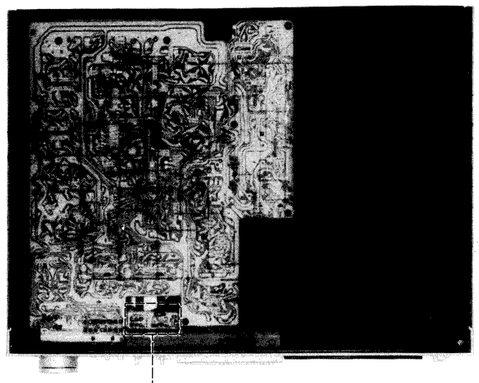
Terminal No.	Symbol	Name	Function/operation
38.	DO7	No connection	Not used.
39.	VDD	Power source	Operated at 4.5V to 6.0V.
40.	OSC	Oscillation terminal	 Oscillation is approx. 300kHz. Because the connection of a probe affects the terminal, nothing should be connected to this terminal for any other measurements. Use COϕ to 3 in measuring the computer's velocity; Approx. 155Hz in STOP condition.

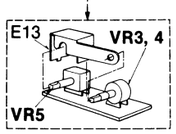
TROUBLESHOOTING OF MAIN CONTROL CIRCUIT

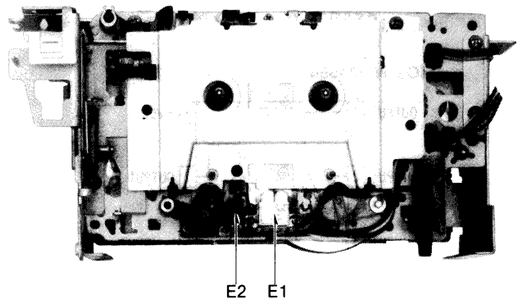
Fault	Probable cause	Microcomputer terminal to check	Relevant mechanism parts	Relevant external parts
Mechanism dose not operate at all.				
FL not lighting	Microcomputer not operating			
	Power not supplied.	39 (VDD)		
	Clock not oscillating.	40 (OSC 10 to 13		C604, R613 to 615
	Reset locked.	27 (RST)		C606,D606,Q217, IC605
	Microcomputer normal. (Scan normal)			
	Connection to FL Driver.	10 to 13 31 to 37		
FL lighting OK. (MODE LED not lighting.)	Half SW. closed.	14 (Ai3)	Half SW.	D603
MODE indicator lighting OK.	Motor circuit faulty.	24, 25	Motor connection	IC602

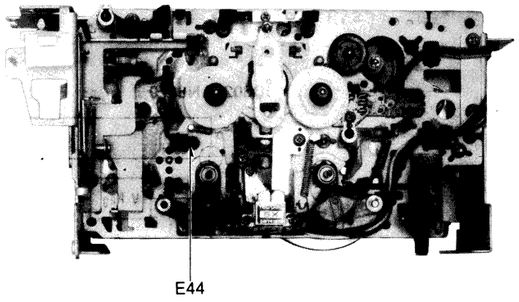
Fault	Probable cause	Microcomputer terminal to check	Relevant mechanism parts	Relevant external parts
Mechanism defective.				
FF/REW reverse rotation.	Reverse connection of motor.	24, 25	Motor connection	IC602
FF/REW motor rotating, reel not rotating.	Brake plunger not being with drawn.	22 (EOϕ)	Brake plunger disconnection, etc.	IC602
CAM continuous rotation in PLAY.	MODE SW. defective.	15 (Ai2)	MODE SW.	D605
Motor rotating in PLAY, but CAM's not switched.	Trigger plunger not operating	23 (EO1)	Trigger plunger	IC602
Motor rotates in reveise and does not stop after switching to PLAY or PAUSE.	PLAY or STOP SW, defective.	16 (Ai1) 17 (Aiϕ)	STOP PLAY Leaf SW.	D602 D604
REC IND. due not light up. (Operation is normal)	LED or drive transistor defective.	7 (CO6)		IC602
PLAY IND. dues not light up.	-do-	8 (CO5)		IC602
PAUSE IND. dues not light up.	-do-	9 (CO4)		IC602
Not counting.	Hall IC faulty, buffer circuit faulty.	14 (Ai3)	Reel magnet	IC603 (Hall IC) Q601, D601
AUTO STOP functioning soon after operation begins.	Same as the above. (Not counting)			
No muting.	Muting output connection etc.	6 (CO7)		
No peak-resetting.	Connection	3 (CO10)		IC605
Accidental erase prevention mechanism not functioning.	Leaf SW	15 (Ai2)	Accidental erasure Leaf SW	D605
Operating during EJECT.	Half detection SW.	14 (Ai3)	Half detection SW.	D603

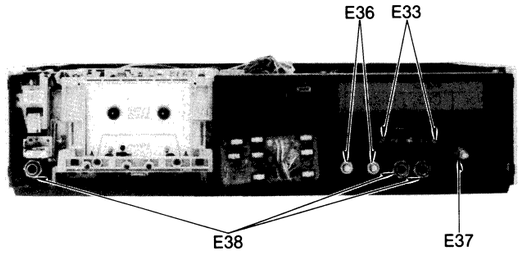
ELECTRICAL PARTS LOCATION

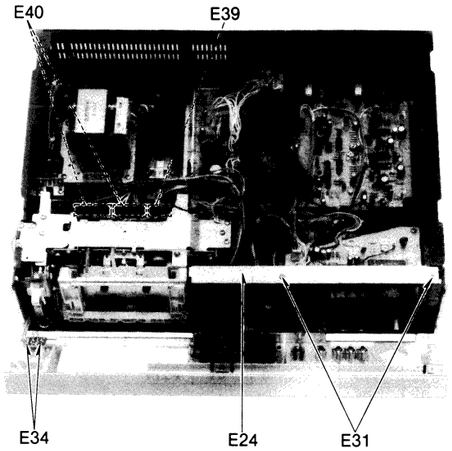


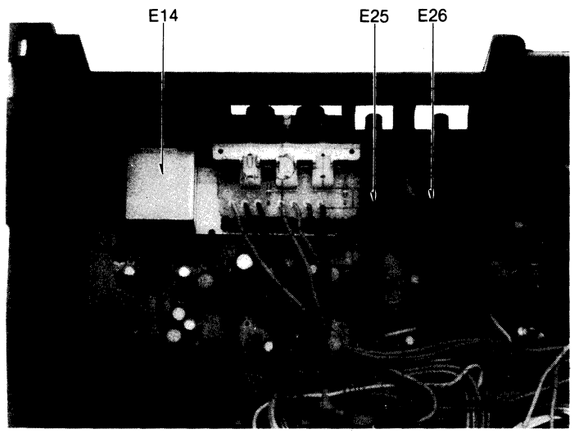


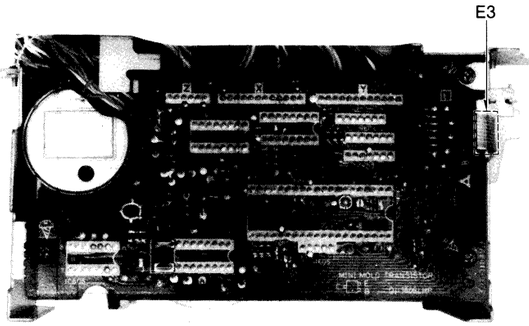


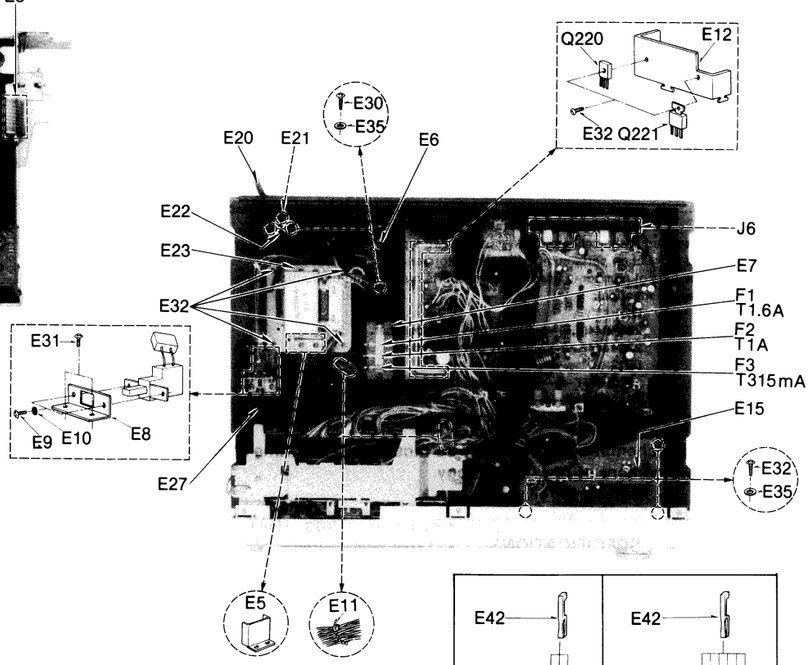


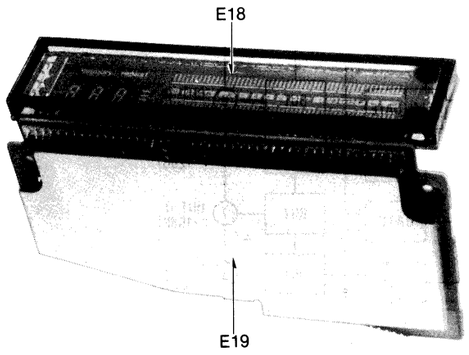


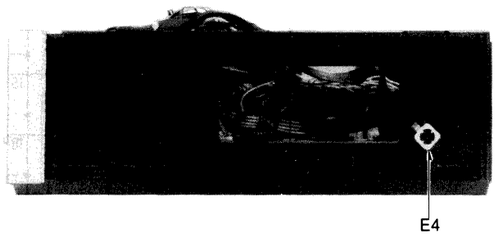


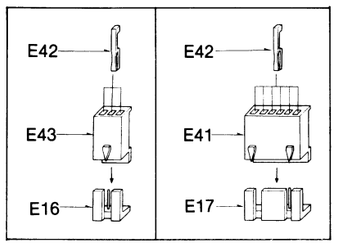


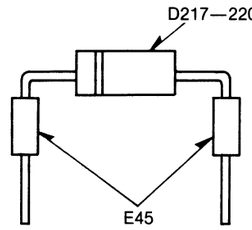










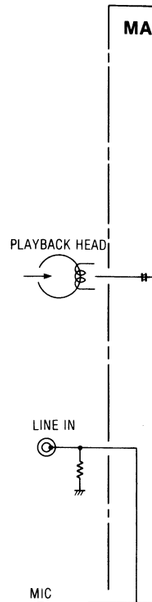


REPLACEMENT PARTS LIST

Important safety notice
Components identified by ⚠ mark have special characteristics important for safety.
When replacing any of these components, use only manufacturer's specified parts.

Ref No.	Part No.	Part Name & Description
	ELECTRICAL PARTS	
E 1	QWY4125ZA	Head (Record/Playback)
E 2	QWY2145	Head (Erase)
E 3	QJI1466RR	Switch-P.B
E 4	QJC0025	Earth Plate
E 5	QMAM0148	Transformer Angle
E 6	QJT4017	4 Pin Terminal Plate
E 7	⚠ QTF1040	Fuse Holder
E 8	QMAM0144	Switch Angle
E 9	XSN3+6S	Screw ⊕3×6
E 10	XWA3B	Washer
E 11	QTD1181	Wire Clamper
E 12	QTM0014	Heat Sink
E 13	QTSM0059	Shield Plate
E 14	QTSM0060	Shield Plate
E 15	QJT1067	Check Pin
E 16	QJP1921TN	3 Pin Post
E 17	QJP1922TN	6 Pin Post
E 18	QSiFM003F	FL Meter
E 19	QTSM0058	Shield Plate
E 20 [D]⚠	SJA88	AC Power Cord
[For all European areas except United Kingdom.]		
[B]⚠	QFC1205M	AC Power Cord
[For United Kingdom.]		
E 21	QBJ1425	Cord Bushing
E 22	QTD1164	Cord Bushing
E 23	QMFM0018	Transformer Angle
E 24	QMAM0145	Pressure Angle
E 25	QKJM0068	Switch Rod (Dolby)
E 26	QKJM0069	Switch Rod (Monitor)
E 27	QKJM0070	Switch Rod (Power Switch)
E 30	XTN3+16B	Tapping Screw ⊕3×16
E 31	XTN3+10B	Tapping Screw ⊕3×10
E 32	XTN3+8B	Tapping Screw ⊕3×8
E 33	XSN3+6S	Screw ⊕3×6
E 34	XTN26+8B	Tapping Screw
E 35	XWG3	Washer
E 36	XNS7	Nut
E 37	XNS9	Nut
E 38	QNQ1070	Nut
E 39	QJP1970M	Plug
E 40	QJP1972M	Plug
E 41	QJS1922TN	Socket (6 Pin)
E 42	QJT1054	Contact
E 43	QJS1921TN	Socket (3 Pin)
E 44	XAMQ44P500	Pilot Lamp
E 45	QZE0003	Porcelain Tube

BLO



BLOCK DIAGRAM

LIST

hark have special
afety.
components, use
parts.

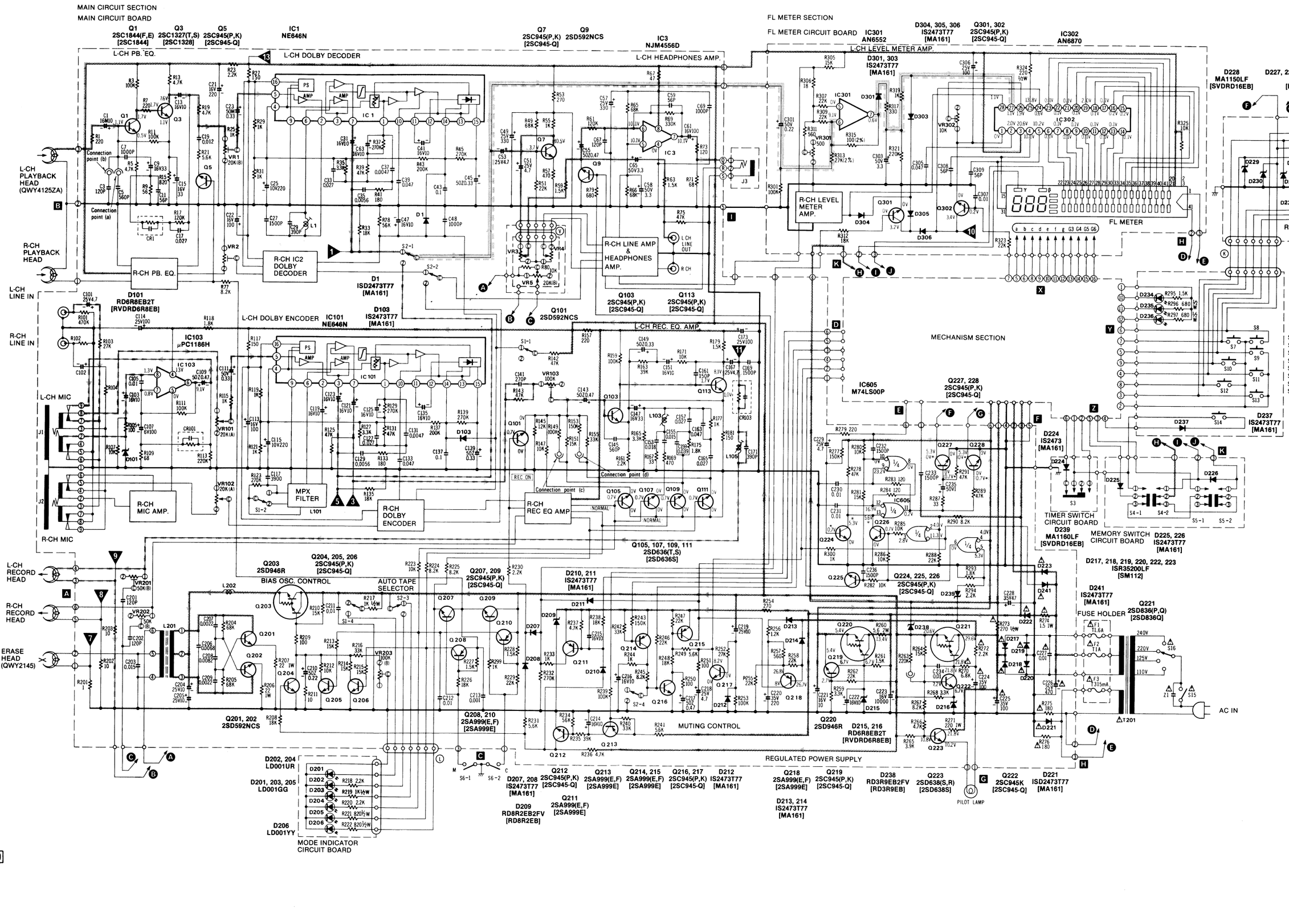
	Part Name & Description
CAL PARTS	
	Head (Record/Playback)
	Head (Erase)
	Switch-P.B
	Earth Plate
	Transformer Angle
	4 Pin Terminal Plate
	Fuse Holder
	Switch Angle
	Screw ⊕3×6
	Washer
	Wire Clamper
	Heat Sink
	Shield Plate
	Shield Plate
	Check Pin
	3 Pin Post
	6 Pin Post
	FL Meter
	Shield Plate
	AC Power Cord
ept United Kingdom.]	
	AC Power Cord
	Cord Bushing
	Cord Bushing
	Transformer Angle
	Pressure Angle
	Switch Rod (Dolby)
	Switch Rod (Monitor)
	Switch Rod (Power Switch)
	Tapping Screw ⊕3×16
	Tapping Screw ⊕3×10
	Tapping Screw ⊕3×8
	Screw ⊕3×6
	Tapping Screw
	Washer
	Nut
	Nut
	Nut
	Plug
	Plug
	Socket (6 Pin)
	Contact
	Socket (3 Pin)
	Pilot Lamp
	Porcelain Tube

D217—220

E45

RS-M273 RS-M273

SCHEMATIC DIAGRAM
MAIN SECTION



1	7.1V
2	7.1V
3	7.2V
4	7.1V
5	7.0V
6	7.1V
7	7.0V
8	0V

1	7.1V
2	7.2V
3	7.2V
4	7.2V
5	7.2V
6	7.2V
7	7.1V
8	7.2V

Q5

	Normal
E	
C	
B	0V

Q9

	STOP PAUSE
E	0
C	0
B	0.7V

Q201,

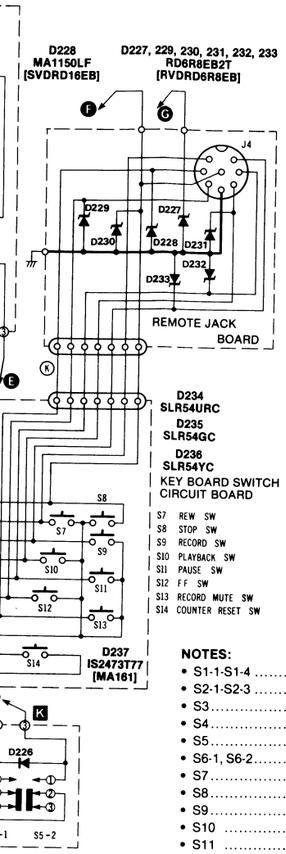
	Normal	C
E	0.3V	0
C	5.9V	7
B	0.8V	6

Q20

	Normal	C
E	6.1V	7
C	20.5V	20
B	7.4V	6

NOTES:

- S1-1-S1-4 .....Dolby IN/OUT selec
- S2-1-S2-3 .....Monitor switch (sho
- S3.....Timer switch (show
- S4.....Memory stop switc
- S5.....Memory repeat swit
- S6-1, S6-2.....Auto tape select sw
- S7.....Rewind switch.
- S8.....Stop switch.
- S9.....Record switch.
- S10 .....Playback switch.
- S11 .....Pause switch.
- S12 .....Fast Forward switc
- S13 .....Rec mute switch.
- S14 .....Counter reset switc
- S15 .....Power ON/OFF swit
- S16 .....AC power voltage s
- VR1, 2 .....Playback gain adjus
- VR3, 4 .....Output level control
- VR5 .....Bias current adjust
- VR101, 102 .....Input level controls.
- VR103, 104 .....Recording gain adju
- VR201, 202 .....Bias current adjustr
- VR203 .....Erase current adjus
- VR301 .....FL meter adjustmer
- VR302 .....FL meter adjustmer
- L1, 2 .....Bias trap adjustmer
- L103, 104 .....Recording EQ adjus
- L105, 106 .....Bias trap adjustmer
- Resistance are in ohms (Ω) 1/4 watt
  1K = 1,000Ω, 1M = 1,000KΩ.
- Capacity are in micro-farads (μF) un
  P = Pico-farads.
- The mark (▼) shows test point. e.g.
- ( ) indicates B+ (bias).
- ( ) indicates the flow of playba
- ( ) indicates the flow of record
- Important safety notice
  Components identified by △ mark ha
  When replacing any of these compo
- Values indicates in ☐ are DC v
- All voltage values shown in circuitry
  Unless otherwise specified, voltage
  STOP, tape mode at NORMAL, and
  REC .....Voltage at record
  PLAY .....Voltage at playba



IC1

1	7.1V	9	0V		
2	7.1V	10	7.1V		
3	7.2V	11	7.1V		
4	7.1V	12	7.1V		
5	7.0V	13	7.1V		
6	7.1V	14	9.5V	7.2V	
7	7.0V	15	9.3V	7.0V	
8	0V	16	14.1V	14.4V	
			OUT	IN	Dolby

IC101

1	7.1V	9	0V		
2	7.2V	10	7.2V		
3	7.2V	11	7.3V		
4	7.2V	12	7.3V		
5	7.2V	13	7.2V		
6	7.2V	14	9.5V	7.2V	
7	7.1V	15	9.2V	7.0V	
8	7.2V	16	14.2V	14.4V	
			OUT	IN	Dolby

Q5

	Normal	CrO_2, Metal
E	0V	
C	0V	
B	0V	0.7V

Q9

	STOP PAUSE	SOURCE POSITION
E	0V	
C	0V	
B	0.7V	0V

Q201, 202

	Normal	CrO_2	Metal
E	0.3V	0.4V	0.7V
C	5.9V	7.5V	14.4V
B	0.8V	0.9V	1.1V

Q203

	Normal	CrO_2	Metal
E	6.1V	7.8V	14.9V
C	20.5V	20.5V	20.5V
B	7.4V	9.0V	16.2V

Q204

	PLAY	REC		
		Nor	CrO_2	Metal
E	0V			
C	0V	7.4V	9.0V	10.2V
B	0.7V	0V		

Q205

	PLAY	REC		
		Nor	CrO_2	Metal
E	0V			
C	0V	7.4V	0V	16.2V
B	0V	0V	0.7V	0V

Q206

	PLAY	REC		
		Nor	CrO_2	Metal
E	0V	0V		
C	0V	7.4V	0V	16.2V
B	0V	0V	0.7V	0V

Q207

	Normal	CrO_2	Metal
E	0V		16V
C	0V	17.8V	18.2V
B	0V		16.7V

Q208

	Normal	CrO_2	Metal
E	0V	17.8V	18.2V
C	0V	17.7V	0V
B	0V	17.1V	18.1V

Q209

	Normal	CrO_2	Metal
E	0V	17.7V	18.1V
C	20.5V	20.5V	20.5V
B	0V	18.4V	18.8V

Q210

	Normal	CrO_2	Metal
E	20.5V	20.5V	20.5V
C	20.5V	0V	0V
B	19.8V	20.4V	20.4V

Q211

	PLAY	REC	REC MUTE	REC PAUSE
E	8.2V	8.2V	—	—
C	7.3V	0V	7.3V	7.3V
B	10.0V	8.1V	7.5V	—

Q212

	PLAY	REC
E	0V	
C	10.5V	0V
B	0V	0.7V

Q213

	PLAY	REC
E	13.4V	11V
C	0V	11V
B	13.4V	10.4V

Q214

	PLAY	REC	PAUSE
E	8.2V	8.2V	—
C	0V	0V	8V
B	8.8V	8.8V	7.5V

Q215

	STOP	PLAY REC SOURCE
E	—	8.2V
C	8V	0V
B	7.4V	8.1V

Q216

	STOP	PLAY REC SOURCE
E	0V	
C	0V	8.1V
B	0.7V	0V

Q227, 228

E	0V
C	5.3V ★ 0V
B	0V ★0.7V

NOTES:

- S1-1-S1-4 .....Dolby IN/OUT select switch (shown in OUT position).
- S2-1-S2-3 .....Monitor switch (shown in TAPE position).
- S3.....Timer switch (shown in OFF position).
- S4.....Memory stop switch (shown in OFF position).
- S5.....Memory repeat switch (shown in OFF position).
- S6-1, S6-2.....Auto tape select switch (shown in Metal position).
- S7.....Rewind switch.
- S8.....Stop switch.
- S9.....Record switch.
- S10 .....Playback switch.
- S11 .....Pause switch.
- S12 .....Fast Forward switch.
- S13 .....Rec mute switch.
- S14 .....Counter reset switch.
- S15 .....Power ON/OFF switch (shown in OFF position).
- S16 .....AC power voltage select switch.
- VR1, 2 .....Playback gain adjustment VR.
- VR3, 4 .....Output level controls.
- VR5 .....Bias current adjustment VR (front panel).
- VR101, 102 .....Input level controls.
- VR103, 104 .....Recording gain adjustment VR.
- VR201, 202 .....Bias current adjustment VR.
- VR203 .....Erase current adjustment VR.
- VR301 .....FL meter adjustment VR (0dB indication).
- VR302 .....FL meter adjustment VR (−20dB indication).
- L1, 2.....Bias trap adjustment coil (playback side).
- L103, 104 .....Recording EQ adjustment coil.
- L105, 106 .....Bias trap adjustment coil (record side).
- Resistance are in ohms (Ω) 1/4 watt unless specified otherwise. 1K = 1,000Ω, 1M = 1,000KΩ.
- Capacity are in micro-farads (μF) unless specified otherwise. P = Pico-farads.
- The mark (▼) shows test point. e.g. ▽ = test point 1.
- ( ) indicates B+ (bias).
- ( ) indicates the flow of playback signal.
- ( ) indicates the flow of recording signal.
- Important safety notice
  Components identified by ⚠ mark have special characteristics important for safety.
  When replacing any of these components, use only manufacturer's specified parts.
- Values indicates in ☐ are DC voltage between the chassis and electrical parts.
- All voltage values shown in circuitry are under no signal condition.
  Unless otherwise specified, voltage measurement conditions are that tape travel is at STOP, tape mode at NORMAL, and Dolby NR switch at OFF.
  REC .....Voltage at record mode.
  PLAY .....Voltage at playback mode.
  REC/PLAY .....Voltage at record/playback mode.
  Normal .....Voltage at Normal tape mode.
  CrO_2.....Voltage at CrO_2 tape mode.
  Metal .....Voltage at Metal tape mode.
  REC-MUTE .....Voltage at record mode (Rec mute: ON).
  Power OFF .....Voltage at muting mode (During power off muting circuit is operating).
  STOP .....Voltage at stop mode.
  Dolby IN .....Voltage at dolby in mode.
  Source.....Voltage at source mode.
  Pause .....Voltage at pause mode.
  ★ .....Voltage at tape slack prevention circuit (during tape slack prevention circuit is operating).
- Described in the schematic diagram are two types of numbers; the supply parts number and production parts number for transistors and diodes.
  One type of number is used for supply parts number and production parts number when they are identical.
  e.g. Q1
  2SC1844(E,F)◄—Production parts number
  2SC1844E◄—Supply parts number
  D212
  1S2473T77◄—Production parts number
  [MA161]◄—Supply parts numbers
- **The supply parts number is described alone in the replacement parts list.**

- **This schematic diagram may be modified at any time with the development of new technology.**

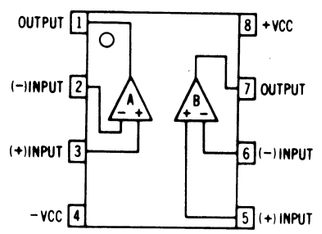
SPECIFICATIONS

* Input level controls ··· MAX
* Output level control ··· MAX

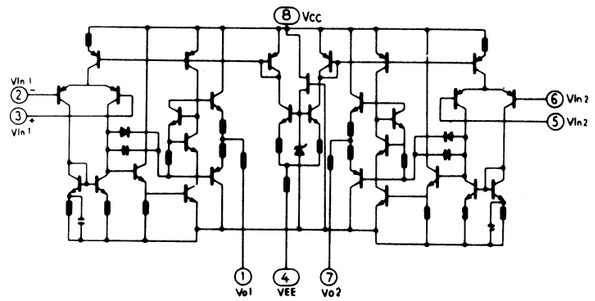
Playback S/N ratio * Test tape ··· QZZCFM	Greater than 47dB
Overall distortion * Test tape ··· QZZCRA for Normal ··· QZZCRX for CrO_2 ··· QZZCRZ for Metal	Less than 2.3% (Normal) Less than 3.0% (CrO_2, Metal)
Overall S/N ratio * Test tape ··· QZZCRX	Greater than 45dB (without NAB filter)

EQUIVALENT CIRCUIT

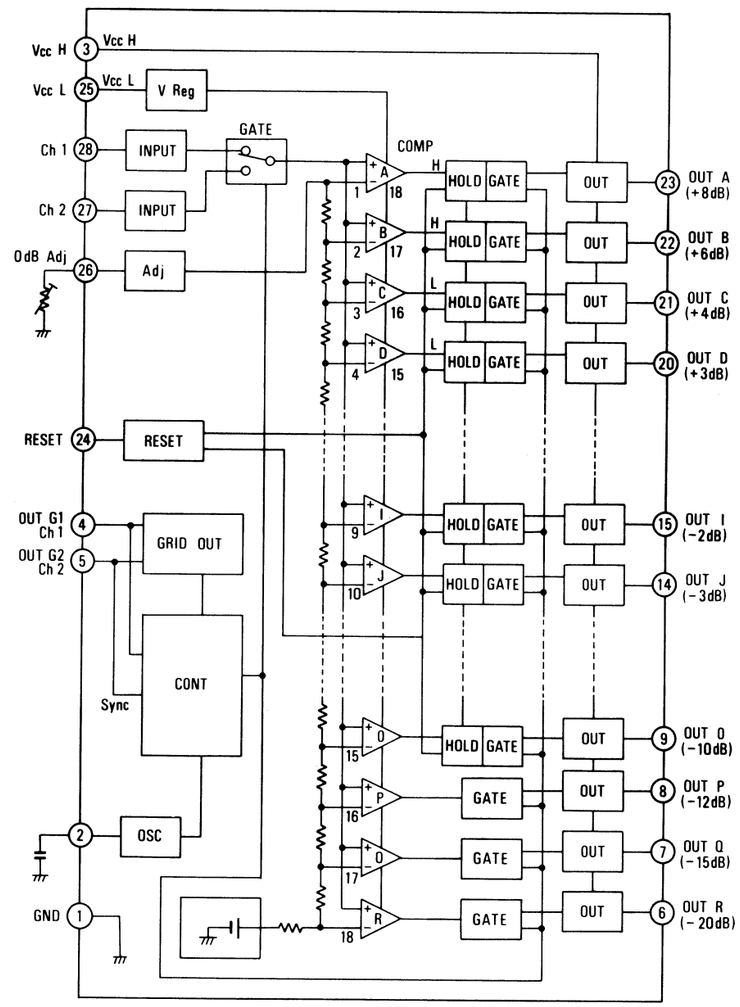
IC3 NJM4556



IC3, 401 AN6552

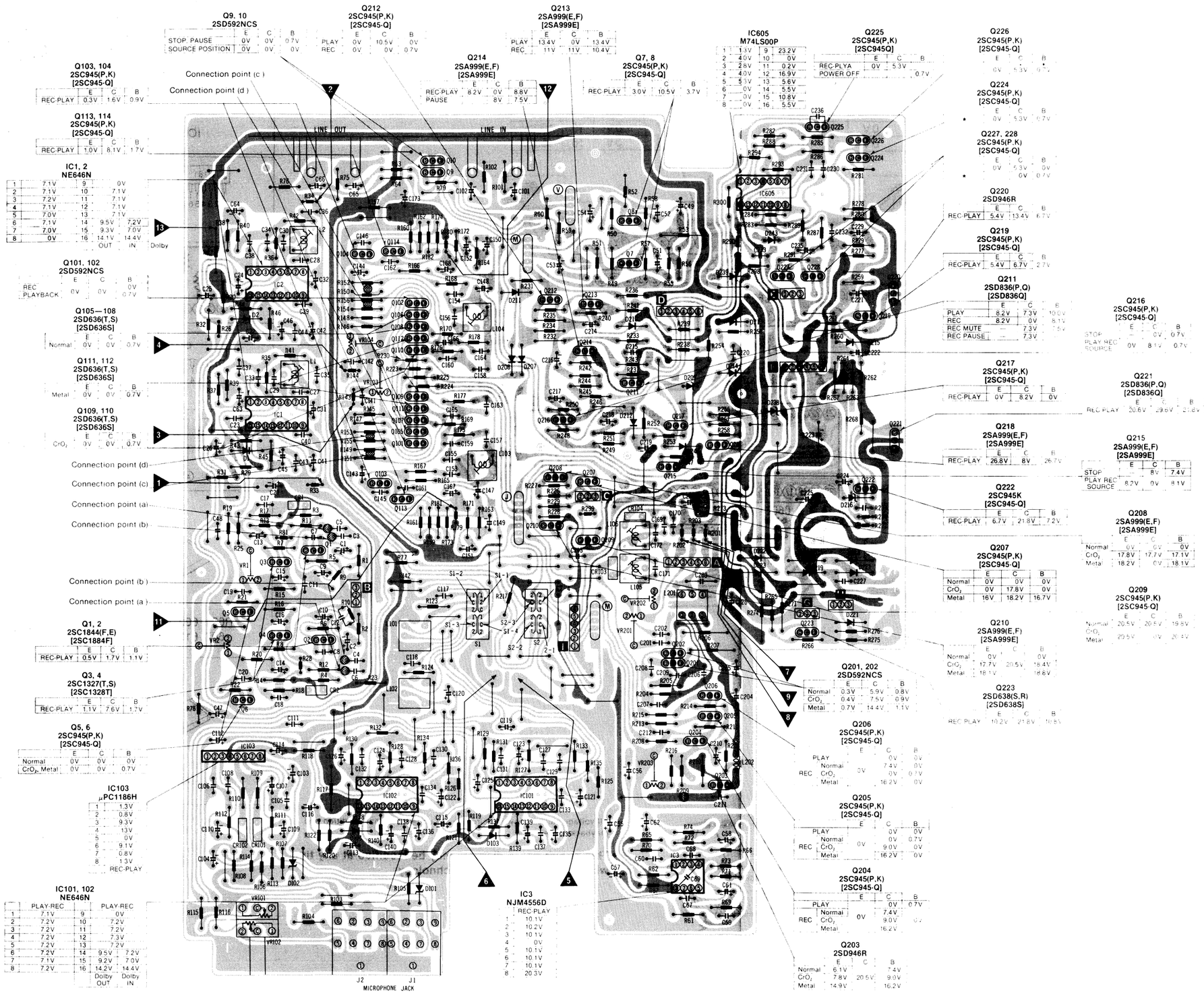


IC302 AN6870

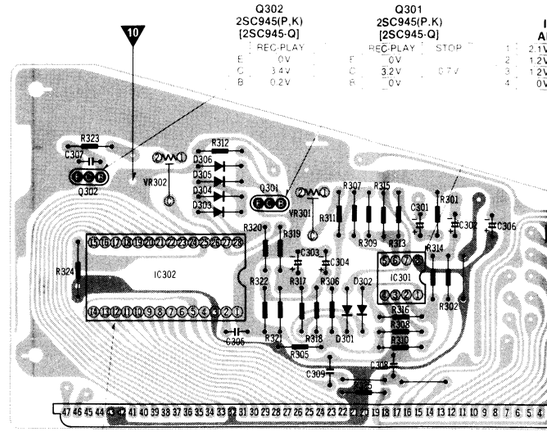


CIRCUIT BOARD

MAIN CIRCUIT BOARD



FL METER CIRCUIT BOARD

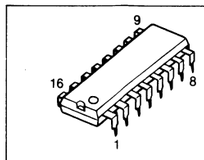


NOTES:

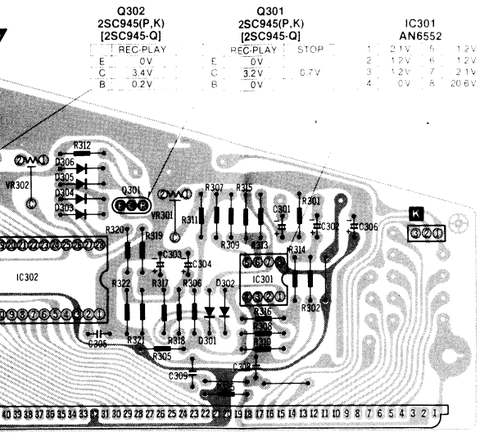
- The circuit shown in ▬ on the conductor is B+ (bias) circuit.
- The circuit shown in ▬ on the conductor side indicates printed circuit o back side of the printed circuit board.
- Values indicates in ☐ are DC voltage between the ground and electrical
- All voltage values shown in circuitry are under no signal condition. Unless otherwise specified, voltage measurement conditions are that tape tr at STOP, tape mode at NORMAL, and Dolby NR switch at OFF.
  REC .....Voltage at record mode.
  PLAY .....Voltage at playback mode.
  Normal .....Voltage at Normal at mode.
  CrO_2.....Voltage at CrO_2 tape mode.
  Metal .....Voltage at Metal tape mode.
  REC·MUTE .....Voltage at record mode (Rec mute: ON).
  Source.....Voltage at Source mode.
- Described in the circuit board diagram are two types of numbers; the supply number and production parts number for transistors. One type of number is for supply parts number and production parts number when they are identica
  e.g. Q212
  2SC945(P,K)◄— Production parts number
  [2SC945-Q]◄— Supply parts number
- **The supply parts number is described alone in the replacement parts list.**

- **This circuit board diagram may be modified at any time w the development of new technology.**

TERMINATIONS



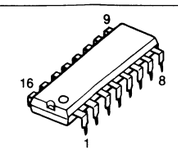
R CIRCUIT BOARD

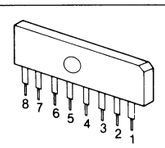


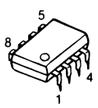
hown in ▬ on the conductor is B+ (bias) circuit.
hown in ▬ on the conductor side indicates printed circuit on the the printed circuit board.
ates in ▭ are DC voltage between the ground and electrical parts.
alues shown in circuitry are under no signal condition.
wise specified, voltage measurement conditions are that tape travel is e mode at NORMAL, and Dolby NR switch at OFF.
.....Voltage at record mode.
.....Voltage at playback mode.
.....Voltage at Normal at mode.
.....Voltage at CrO_2 tape mode.
.....Voltage at Metal tape mode.
.....Voltage at record mode (Rec mute: ON).
.....Voltage at Source mode.
the circuit board diagram are two types of numbers; the supply parts production parts number for transistors. One type of number is used arts number and production parts number when they are identical.
212
SC945(P,K)◄—Production parts number
SC945-Q]◄—Supply parts number
parts number is described alone in the replacement parts list.

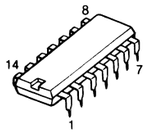
uit board diagram may be modified at any time with opment of new technology.

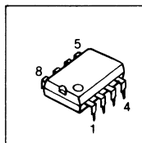
TERMINATIONS

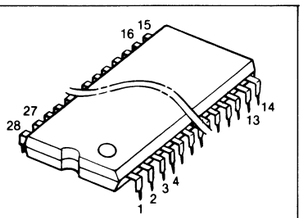

IC1, 2, 101, 102

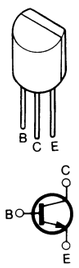

IC103

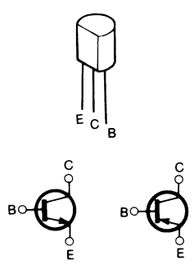

IC3

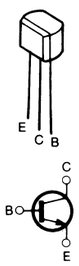

IC605

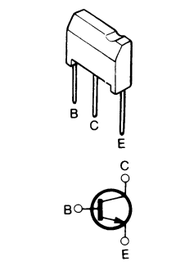

IC301

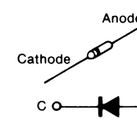

IC302

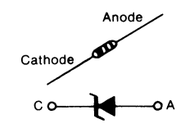

Q1, 2, 9, 10, 101, 102, 201, 202

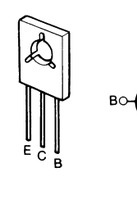

Q3, 4 / Q208, 210, 211, 213, 214, 215, 218

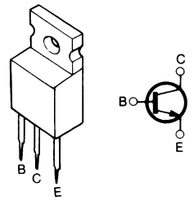

Q5, 6, 7, 8, 103, 104, 113, 114, 204, 205, 206, 207, 209, 212, 216, 217, 219, 222, 224∼228, 301, 302


Q105∼112, 223


D1, 2, 103, 104, 207, 208, 210, 211, 212, 213, 214, 221, 225, 226, 237, 301∼306


D101, 102, 215, 216, 227, 229, 230, 231, 232, 233


Q203, 220


Q221

NOTES: RESISTORS
ERD ...Carbon
ERG ...Metal-oxide
ERS ...Metal-oxide
ERO ...Metal-film
ERX ...Metal-film
ERQ ...Fuse type metallic
ERC ...Solid
ERF ...Cement

CAPACITORS
ECBA .....Ceramic
ECG□.....Ceramic
ECK□.....Ceramic
ECC□.....Ceramic
ECF□.....Ceramic
ECQM.....Polyester film
ECQE .....Polyester film
ECQF .....Polypropylene
ECE□.....Electrolytic
ECE□N ...Non polar electrolytic
ECQS .....Polystyrene
ECS□.....Tantalum
QCS .....Tantalum

REPLACEMENT PARTS LIST

Important safety notice
Components identified by ⚠ mark have special characteristics important for safety.
When replacing any of these components, use only manufacturer's specified parts.

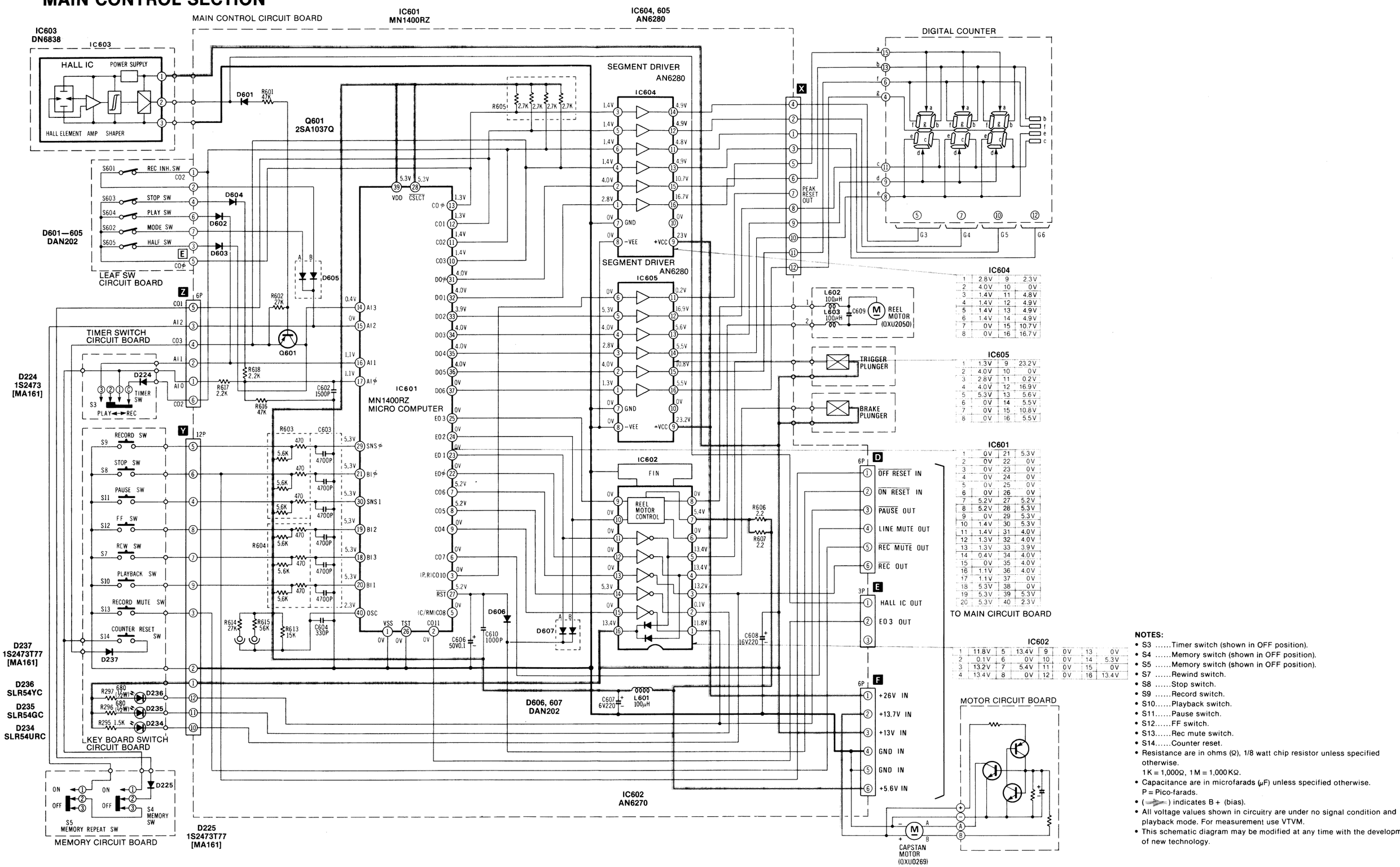
Ref No.	Part No.
RESISTORS	
R 1, 2	ERD25FJ221
R 3, 4	ERD25TJ104
R 5, 6	ERD25FJ472
R 7, 8	ERD25FJ221
R 9	ERD25FJ560
R 10	ERD25TJ560
R 11, 12	ERD25TJ104
R 13, 14	ERD25FJ472
R 15, 16	ERD25FJ821
R 17, 18	ERD25TJ124
R 19, 20	ERD25FJ472
R 21, 22	ERD25FJ562
R 23	ERD25FJ222
R 25, 26	ERD25FJ102
R 27	ERG1ANJ151
R 29, 30, 31, 32	ERD25FJ102
R 33, 34	ERD25TJ183
R 35, 36	ERD25FJ332
R 37, 38	ERD25TJ274
R 39, 40	ERD25TJ473
R 41, 42	ERD25FJ181
R 43, 44	ERO25TKG2003
R 45, 46	ERD25TJ274
R 49, 50	ERD25TJ683
R 51, 52	ERD25TJ223
R 53	ERD25FJ271
R 55, 56	ERD25FJ102
R 57, 58	ERD25FJ471
R 59, 60	ERD25FJ152
R 61, 62	ERD25TJ124
R 63, 64	ERD25FJ152
R 65, 66	ERD25TJ683
R 67	ERQ14AJ470P
R 69, 70	ERD25TJ334
R 71, 72	ERD25FJ680
R 73, 74	ERD25FJ121
R 75, 76	ERD25TJ473
R 77	ERD25FJ822
R 78	ERD25TJ563
R 79	ERD25FJ681
R 80	ERD25FJ103
R 101, 102	ERD25TJ474
R 103, 104	ERD25TJ273
R 105, 106	ERD25FJ101
R 107, 108	ERD25FJ103
R 109, 110	ERD25FJ680
R 111, 112	ERD25TJ104
R 113, 114	ERD25TJ224
R 115, 116	ERD25FJ102
R 117	ERG1ANJ151
R 118	ERD25FJ182
R 119, 120, 121, 122	ERD25FJ102
R 123, 124	ERD25TJ274
R 125, 126	ERD25TJ473
R 127, 128	ERD25FJ332
R 129, 130	ERD25TJ274
R 131, 132	ERD25TJ473
R 133, 134	ERD25FJ181
R 135, 136	ERD25TJ183
R 137, 138	ERO25TKG2003
R 139, 140	ERD25TJ274
R 142, 143, 144	ERD25TJ473
R 145, 146	ERD25TJ123
R 147, 148	ERD25FJ103
R 149, 150	ERD25TJ104
R 151, 152	ERD25TJ153
R 153, 154	ERD25TJ154
R 155, 156	ERD25TJ333
R 157	ERD25FJ221
R 159, 160	ERD25TJ104
R 161, 162	ERD25FJ222
R 163, 164	ERD25TJ393
R 165, 166	ERD25FJ332
R 167, 168	ERD25FJ330
R 169, 170	ERD25FJ471
R 171, 172	ERD25FJ103
R 173, 174	ERD25TJ224
R 175, 176	ERD25FJ182
R 177, 178	ERD25FJ102
R 179, 180	ERD25FJ152
R 181, 182	ERD25FJ151
R 201	ERD25FJ1R0
R 202, 203	ERD25FJ100
R 204, 205	ERD25TJ683
R 206, 207	ERG1ANJ220
R 208	ERD25TJ183
R 209	ERD25FJ101
R 210	ERD25TJ153
R 211	ERD25FJ100
R 212	ERD25FJ103
R 213, 214, 215	ERD25TJ153
R 216	ERD25TJ333
R 217	ERG12ANJ102
R 218	ERD25FJ222
R 219	ERG12ANJ102
R 220	ERD25FJ222
R 221, 222	ERD50FJ821
R 223	ERD25FJ103
R 224, 225	ERD25FJ822
R 226	ERD25TJ183
R 227, 228	ERD25FJ152
R 229	ERD25TJ223
R 230	ERD25FJ222
R 231	ERD25FJ562
R 232	ERD25TJ274
R 233	ERD25FJ102
R 234	ERD25TJ563
R 235	ERD25TJ183
R 236	ERD25FJ562
R 237	ERD25FJ682
R 238	ERD25TJ183
R 239	ERD25TJ104
R 240	ERD25TJ333
R 241	ERD25FJ562
R 242	ERD25TJ333
R 243	ERD25TJ154
R 244	ERD25FJ102
R 245	ERD25FJ822
R 246, 247	ERD25TJ223
R 248	ERD25TJ183
R 249	ERD25FJ562
R 250, 251	ERD25FJ101
R 252, 253	ERD25TJ273
R 254	ERD25FJ271
R 255	ERD25TJ223
R 256	ERD25FJ122
R 257	ERD25FJ561
R 258	ERD25TJ223
R 259	ERD25FJ332
R 260	ERG2ANJ5R6
R 261	ERD25FJ152
R 262	ERD25TJ223
R 263	ERD25TJ224
R 264	ERO25KF1502
R 265	ERD25FJ392
R 266	ERD25FJ472
R 267	ERO25CKF8201
R 268	ERD25FJ332
R 269	ERG1ANJ3R9
R 270 ⚠	ERD25FJ682
R 271	ERG1ANJ221
R 272 ⚠	ERD25FJ222
R 273	ERQ12AJ181P
R 274 ⚠	EPX1ANJ1R5
R 275, 276 ⚠	ERQ14AJ181P
R 277	ERD25TJ154
R 278	ERD25TJ473
R 279	ERD25FJ221
R 280	ERD25FJ103
R 281	ERD25TJ153
R 282	ERD25FJ103
R 283, 284	ERD25FJ121
R 285, 286	ERD25FJ103
R 287	ERD25FJ330
R 288	ERD25TJ223
R 289	ERD25FJ473
R 290	ERD25FJ822
R 291	ERD25TJ473
R 292	ERD25FJ103
R 293	ERD25FJ182
R 294	ERD25FJ222
R 295	ERD25FJ152
R 296, 297	ERG12ANJ681
R 299, 300	ERD25FJ102
R 301, 302	ERD25TJ104
R 305	ERD25TJ153
R 306	ERD25FJ180
R 307, 308, 309, 310	ERD25TJ223
R 311	ERD25FJ561
R 312	ERD25TJ183
R 313, 314	ERO25KG2702S
R 315, 316	ERO25CKF1003
R 317, 318	ERD25FJ331
R 319, 320	ERD25FJ102
R 321, 322	ERD25TJ224
R 323	ERD25TJ223
R 324	ERG12ANJ221P
R 325	ERD25FJ103
R 601	RRD18XJ473
R 602	RRD18XK273
R 603, 604	EXBD86181K
R 605	EXBEQ4272K
R 606, 607	RRD18XK2R2
R 613	RRD18XK153
R 614	RRD18XK273
R 615	RRD18XK563
R 616	RRD18XJ473
R 617, 618	RRD18XJ222
CHIP JUMPERS	
JP 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22	RRD18XK000
VRIABLE RESISTORS	
VR 1, 2	EVNM4AA00B24
VR 3, 4	QVJRAF15A14
VR 5	VJK0AF15B24
VR 101, 102	QVK16B20MA24
VR 103, 104	EVNM4AA00B15
VR 201, 202	EVNM4AA00B54
VR 203	EVNM4AA00B15
VR 301	EVNK4AA00B52
VR 302	EVNM4AA00B14
CAPACITORS	
C 1, 2	ECEA16M10R
C 3, 4	ECCD1H121KC
C 5, 6	ECKD1H561KB
C 7, 8	ECKD1H102KB
C 9, 10	ECEA1CS330
C 11	ECCD1H560K
C 12	ECCD1H560K
C 13, 14	ECEA1HS100
C 15, 16	ECEA1CS330
C 17, 18	ECQM1H273JZ
C 19, 20	ECQM1H123JZ
C 21, 22	ECEA1ES101
C 23, 24	ECEA50MR33R
C 25, 26	ECEA1AS221
C 27, 28	ECKD1H152KB
C 29, 30	ECQP1391JZ
C 31, 32	ECEA1HS100
C 33	ECQM1H273JZ
C 35, 36	ECQM1H562JZ
C 37, 38	ECQM1H472JZ
C 39, 40	ECQV05473JZ
C 41, 42	ECEA1HS100
C 43	ECQV05104JZ
C 44	ECQV05104JZ
C 45, 46	ECEA50ZR33
C 47	ECEA1HS100
C 48	ECKD1H102KB
C 49	ECEA1ES331
C 51, 52, 53, 54	ECEA25Z4R7
C 55, 56	ECEA50ZR47
C 57	ECEA1ES331
C 58	ECEA50Z3R3
C 59, 60	ECCD1H560K
C 61, 62	ECEA1ES101
C 63, 64	ECEA1HS100
C 65, 66	ECEA50Z3R3
C 67, 68	ECCD1H121KC
C 69	ECKD1H102KB
C 101, 102	ECEA25Z4R7
C 103, 104	ECEA16M10R
C 105, 106	ECKD1H103MD
C 107, 108	ECEA1AS101
C 109, 110	ECEA50ZR47
C 111, 112	ECEA50MR33R
C 113, 114	ECEA1ES101
C 115, 116	ECEA1AS221
C 117, 118	ECQP1392JZ
C 119, 120, 121, 122, 123, 124, 125, 126	ECEA1HS100
C 127, 128	ECQM1H273JZ
C 129, 130	ECQM1H562JZ
C 131, 132	ECQM1H472JZ
C 133, 134	ECQV05473JZ
C 135, 136	ECEA1HS100
C 137, 138	ECQV05104JZ
C 139, 140	ECEA50ZR33
C 141, 142	ECCD1H271K
C 143, 144	ECEA50ZR47
C 145, 146	ECKD1H561KB
C 147, 148	ECEA1CS330
C 149, 150	ECEA50ZR33
C 151, 152	ECEA1HS100
C 153, 154	ECQV05183JZ
C 155, 156	ECQV05153JZ
C 157, 158	ECQV05273JZ
C 159, 160	ECQV05393JZ
C 161, 162	ECCD1H151KC
C 163, 164	ECQV05473JZ
C 165, 166	ECQV05273JZ
C 167, 168	ECEA25Z4R7
C 169, 170	ECKD1H152KB
C 171, 172	ECQP1391JZ
C 173	ECEA1ES101
C 201, 202	ECCD1H121KC
C 203	ECQF4153KZH
C 204, 205	ECEA1HS100
C 206	ECQF6682KZH
C 207	ECQM1H222JZ
C 208	ECQM1H822KZ
C 209	ECQM1H222JZ
C 210	ECEA50ZR22
C 211, 212	ECKD1H103MD
C 213	ECKD1H102KB
C 214	ECEA1HS100
C 215	ECEA1CN100S
C 216	ECEA1HS100
C 217	ECEA50ZR47
C 218	ECEA25Z4R7
C 219	ECEA1HS100
C 220	ECEA1VS221
C 221, 222	ECEA1HS100
C 223	ECET16R103S
C 224 ⚠	ECEA1VS101
C 225 ⚠	ECEA1VS222
C 226 ⚠	ECEA1ES471
C 227 ⚠	ECKD1H103MD
C 228	ECEA1HS470
C 229	ECEA25Z4R7
C 230, 231	ECKD1H103MD
C 232, 233	ECKD1H152KB
C 234	ECKD1H103MD
C 235	ECEA50ZR47
C 236	ECKD1H152KB
C 301, 302, 303, 304	ECEA50Z3R3
C 305	ECQV05473JZ
C 306	ECEA1ES101
C 307	ECKD1H103MD
C 308, 309	ECCD1H560K
C 602	QCUX1H152MRX
C 603	EXFP6472ZW
C 604	QCUX1H331KCX
C 606	ECEA50ZR1
C 607	ECEA1AS221
C 608	ECEA1CS221
C 609	ECEA1CN100
C 610	QCUX1H102MRX
COMBINATION PARTS	
CR 1, 2	EXRP681K472
CR 101, 102	EXRP152K562
CR 103, 104	EXRP152K222
SPARK KILLER	
Z 1 ⚠	QCR0011
TRANSISTORS	
Q 1, 2	2SC1844F
Q 3, 4	SC1328T
Q 5, 6, 7, 8	2SC945-Q
Q 9, 10,	2SD592NCS
Q 101, 102	2SD592NCS
Q 103, 104	2SC945-Q
Q 105, 106, 107, 108, 109, 111, 112	2SD636S
Q 113, 114	2SC945-Q
Q 201, 202	2SD592NCS
Q 203	2SD946R
Q 204, 205, 206, 207	2SC945-Q
Q 208	2SA999E
Q 209	2SC945-Q
Q 210, 211	2SA999E
Q 212	2SC945-Q
Q 213, 214, 215	2SA999E
Q 216, 217	2SC945-Q
Q 218	2SA999E
Q 219	2SC945-Q
Q 220	2SD946R
Q 221	2SD836Q
Q 222	2SC945-Q
Q 223	2SD638S
Q 224, 225, 226, 227, 228, 301, 302	2SC945-Q
Q 601	2SA1037Q
DIODES & RECTIFIERS	
D 1, 2	MA161
D 101, 102	RVDRD6R8EB
D 103, 104	MA161
D 201	LD001GG
D 202	LD001UR
D 203	LD001GG
D 204	LD001UR
D 205	LD001GG
D 206	LD001YY
D 207, 208	MA161
D 209	RD8R2EB
D 210, 211, 212, 213, 214	MA161
D 215, 216	RVDRD6R8EB
D 217, 218, 219, 220	⚠ SM112
D 221 ⚠	MA161
D 222, 223 ⚠	SM112
D 224, 225, 226	MA161
D 227	RVDRD6R8EB
D 228	SVDRD16EB
D 229, 230, 231, 232, 233	RVDRD6R8EB
D 234	SLR54URC
D 235	SLR54GC
D 236	SLR54YC
D 237	MA161
D 238	RD5R6EB
D 239	SVDRD16EB
D 241 ⚠	MA161
D 301, 302, 303, 304, 305, 306	MA161
D 601, 602, 603, 604, 605, 606, 607	DAN202
INTEGRATED CIRCUITS	
IC 1, 2	NE646N
IC 3	NJM4556D
IC 101, 102	NE646N
IC 103	UPC1186H
IC 301	AN6552
IC 302	AN6870
IC 601	MN1400RZ
IC 602	AN6270
IC 603	DN6838
IC 604, 605	AN6280
IC 606	M74LS00P

Ref No.	Part No.	Part Name & Description
		COILS
L 1, 2	QLQX1032W	Bias Trap Coil
L 101, 102	QLM9Z9K	MPX Filter
L 103, 104	QLQC2721K	Peaking Coil
L 105, 106	QLQX1032W	Bias Trap Coil
L 201	QLB0202K	Bias Oscillation Coil
L 202	QLQX2421Y	RF Trap Coil
L 601	ELEH101KA	Noise Trap Coil
L 602, 603	QLQZ1014D	Noise Trap Coil
		TRANSFORMER
T 201 ⚠	QLPD59EME	AC Power Transformer
		FUSES
F 1 ⚠	XBA0010	Fuse (T1.6A)
F 2 ⚠	XBAQ100027	Fuse (T1A)
F 3 ⚠	XBAQ0006	Fuse (T315mA)
		SWITCHES
S 1	QSWY205A	Push Switch (Dolby IN/OUT)
S 2	QSWY205A	Push Switch (Monitor/Tape)
S 3	QSS2303H	Slide Switch (Timer ON/OFF)
S 4	QSWX309A	Push Switch (Memory Stop)
S 5	QSWX309A	Push Switch (Memory Repeat)
S 6	QSB0266	Switch (Leaf Type)
S 7	QSW1118H	Push Switch (Rewind)
S 8	QSW1118H	Push Switch (Stop)
S 9	QSW1118H	Push Switch (Record)
S 10	QSW1118H	Push Switch (Play back)
S 11	QSW1118H	Push Switch (Pause)
S 12	QSW1118H	Push Switch (Fast Forward)
S 13	QSW1118H	Push Switch (Rec Mute)
S 14	QSW1118H	Push Switch (Counter Reset)
S 15 ⚠	QSW117AS	Push Switch (Power ON/OFF)
S 16 ⚠	QSR1407	Rotary Switch (Power Voltage Select)
S 601, 602, 603	QSB0260	Switch (Leaf Type)
S 604, 605	QSB0261	Switch (Leaf Type)
		JACKS
J 1, 2	QJA0261H	MIC Jack
J 3	QJA0259H	Headphones (Jack)
J 4	QJS1955H	Socket (Remote Jack)
J 5	QEJ5003H	Jack Board

RS-M273 RS-M273

SCHEMATIC DIAGRAM

MAIN CONTROL SECTION



IC604

1	2.8V	9	2.3V
2	4.0V	10	0V
3	1.4V	11	4.8V
4	1.4V	12	4.9V
5	1.4V	13	4.9V
6	1.4V	14	4.9V
7	0V	15	10.7V
8	0V	16	16.7V

IC605

1	1.3V	9	23.2V
2	4.0V	10	0V
3	2.8V	11	0.2V
4	4.0V	12	16.9V
5	5.3V	13	5.6V
6	0V	14	5.5V
7	0V	15	10.8V
8	0V	16	5.5V

IC601

1	0V	21	5.3V
2	0V	22	0V
3	0V	23	0V
4	0V	24	0V
5	0V	25	0V
6	0V	26	0V
7	5.2V	27	5.2V
8	5.2V	28	5.3V
9	0V	29	5.3V
10	1.4V	30	5.3V
11	1.4V	31	4.0V
12	1.3V	32	4.0V
13	1.3V	33	3.9V
14	0.4V	34	4.0V
15	0V	35	4.0V
16	1.1V	36	4.0V
17	1.1V	37	0V
18	5.3V	38	0V
19	5.3V	39	5.3V
20	5.3V	40	2.3V

IC602

1	11.8V	5	13.4V	9	0V	13	0V
2	0.1V	6	0V	10	0V	14	5.3V
3	13.2V	7	5.4V	11	0V	15	0V
4	13.4V	8	0V	12	0V	16	13.4V

NOTES:

- S3 .....Timer switch (shown in OFF position).
- S4 .....Memory switch (shown in OFF position).
- S5 .....Memory switch (shown in OFF position).
- S7 .....Rewind switch.
- S8 .....Stop switch.
- S9 .....Record switch.
- S10.....Playback switch.
- S11.....Pause switch.
- S12.....FF switch.
- S13.....Rec mute switch.
- S14.....Counter reset.
- Resistance are in ohms (Ω), 1/8 watt chip resistor unless specified otherwise.
  1K = 1,000Ω, 1M = 1,000KΩ.
- Capacitance are in microfarads (μF) unless specified otherwise.
  P = Pico-farads.
- ( ) indicates B + (bias).
- All voltage values shown in circuitry are under no signal condition and playback mode. For measurement use VTVM.
- This schematic diagram may be modified at any time with the developm of new technology.

CIRCUIT BOARD

MAIN CONTROL CIRCUIT BOARD

IC601
MN1400RZ

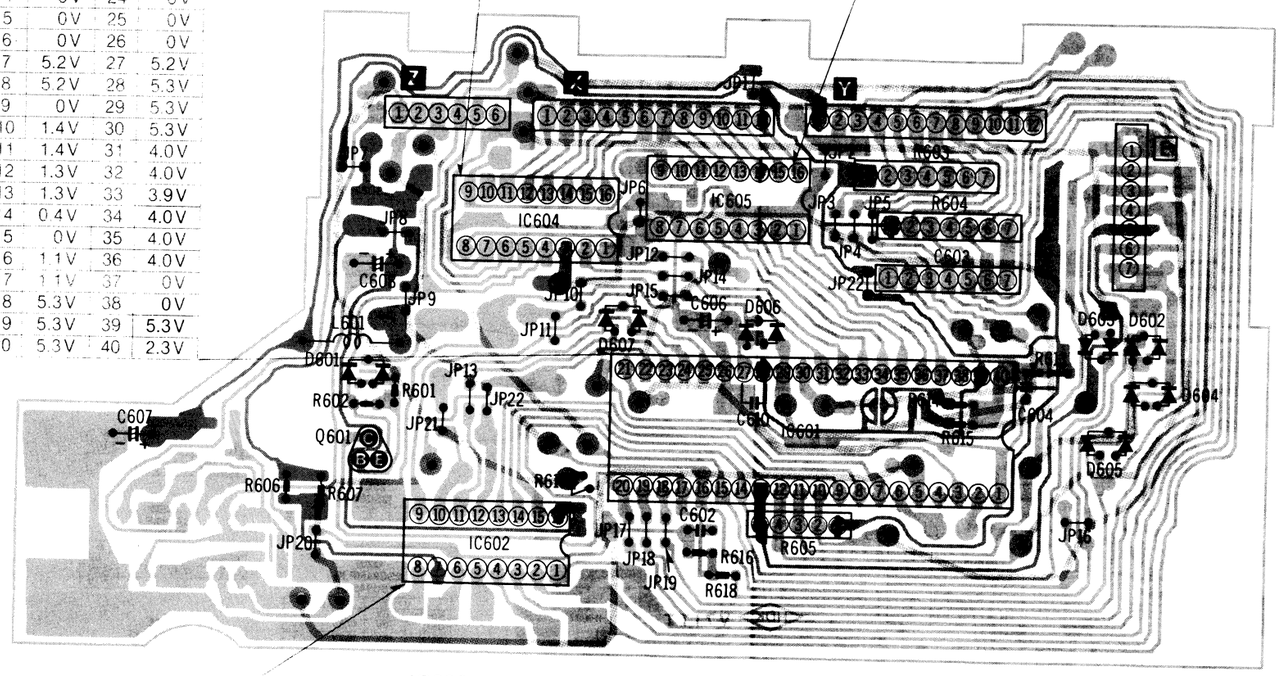
1	0V	21	5.3V
2	0V	22	0V
3	0V	23	0V
4	0V	24	0V
5	0V	25	0V
6	0V	26	0V
7	5.2V	27	5.2V
8	5.2V	28	5.3V
9	0V	29	5.3V
10	1.4V	30	5.3V
11	1.4V	31	4.0V
12	1.3V	32	4.0V
13	1.3V	33	3.9V
14	0.4V	34	4.0V
15	0V	35	4.0V
16	1.1V	36	4.0V
17	1.1V	37	0V
18	5.3V	38	0V
19	5.3V	39	5.3V
20	5.3V	40	2.3V

IC604
AN6280

1	2.8V	9	23V
2	4.0V	10	0V
3	1.4V	11	4.8V
4	1.4V	12	4.9V
5	1.4V	13	4.9V
6	1.4V	14	4.9V
7	0V	15	10.7V
8	0V	16	16.7V

IC605
M74LS00P

1	1.3V	9	23.2V
2	4.0V	10	0V
3	2.8V	11	0.2V
4	4.0V	12	16.9V
5	5.3V	13	5.6V
6	0V	14	5.5V
7	0V	15	10.8V
8	0V	16	5.5V



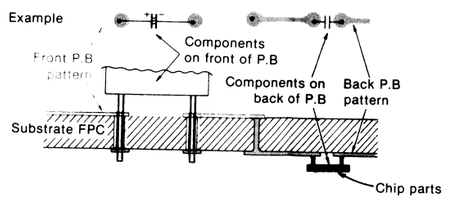
IC602
AN6270

1	11.8V	5	13.4V	9	0V	13	0V
2	0.1V	6	0V	10	0V	14	5.3V
3	13.2V	7	5.4V	11	0V	15	0V
4	13.4V	8	0V	12	0V	16	13.4V

.Timer switch (shown in OFF position).
.Memory switch (shown in OFF position).
.Memory switch (shown in OFF position).
.Rewind switch.
.Stop switch.
Record switch.
Playback switch.
Pause switch.
FF switch.
Rec mute switch.
Counter reset.
nce are in ohms (Ω), 1/8 watt chip resistor unless specified
se.
00Ω, 1M = 1,000KΩ.
ance are in microfarads (μF) unless specified otherwise.
-farads.
indicates B+ (bias).
ge values shown in circuitry are under no signal condition and
k mode. For measurement use VTVM.
ematic diagram may be modified at any time with the development
echnology.

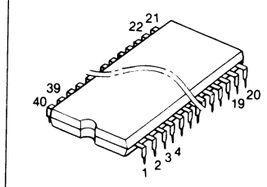
NOTES:

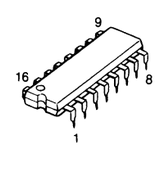
- The circuit shown in ▬ on the conductor is B+ (bias) circuit.
- The circuit shown in ▒ on the conductor indicates printed circuit on the front side of the printed circuit board.
- Black pattern represents back of P.B (chip side).
- The symbols (●) shown in the circuit board indicate connection point between conductors on the front side and back side of the circuit board.
- Components on front of P.B are identified by black symbols.
- Components on back of P.B are identified by green symbols.

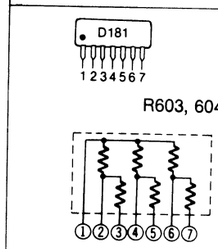


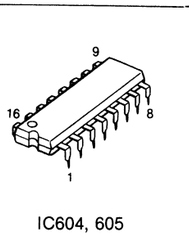
- All voltage values shown in circuitry are under no signal condition and playback mode.
- **This circuit board diagram may be modified at any time with development of new technology.**

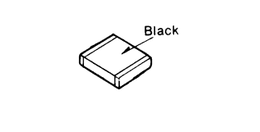
TERMINATIONS

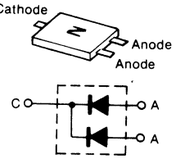


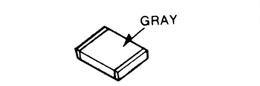


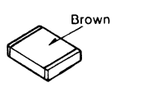


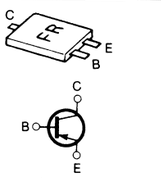








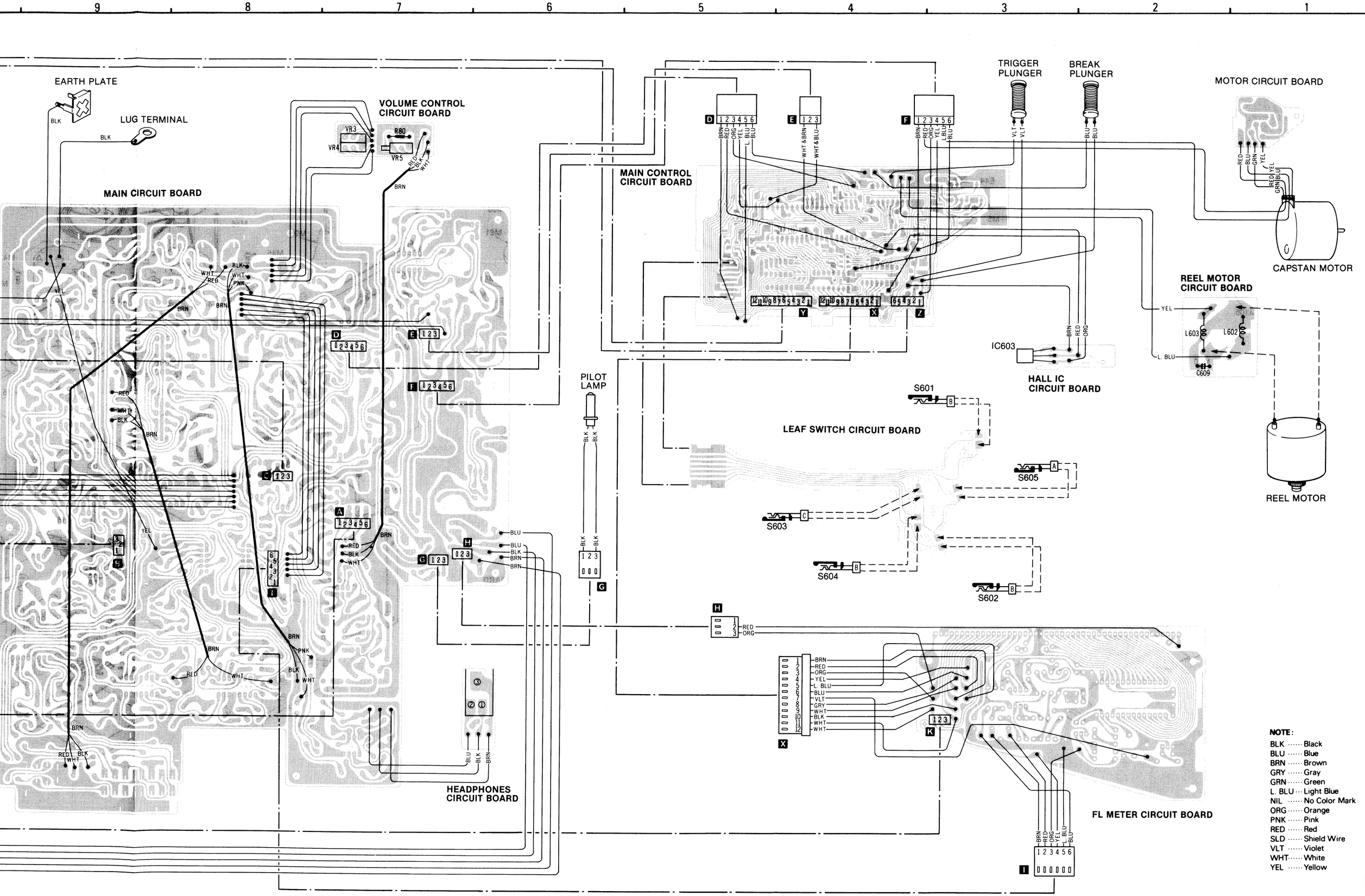




WIRING CONNECTION DIAGRAM

TIMER SWITCH CIRCUIT BOARD
MEMORY SWITCH CIRCUIT BOARD
S6-2: AUTO TAPE SELECT SWITCH (FOR CrO_2 TAPE)
S6-1: AUTO TAPE SELECT SWITCH (FOR METAL TAPE)
KEY BOARD SWITCH CIRCUIT BOARD
EARTH PLATE
LUG TERMINAL
MAIN CIRCUIT BOARD
VOLUME CONTROL CIRCUIT BOARD
MAIN CONTROL CIRCUIT BOARD
AC POWER CORD
4 PIN TERMINAL PLATE
REMOTE JACK BOARD
SPARK KILLER
S15: POWER ON/OFF SWITCH
RECORD/PLAYBACK HEAD
ERASE HEAD
MODE INDICATOR CIRCUIT BOARD
PILOT LAMP
LEAF SWITCH CIRCU
S603
S604
S16: AC POWER VOLTAGE SELECT SWITCH
T201: AC POWER TRANSFORMER
FUSE HOLDER
F1 (T1.6A)
F2 (T1A)
F3 (T315mA)
HEADPHONES CIRCUIT BOARD

RS-M273

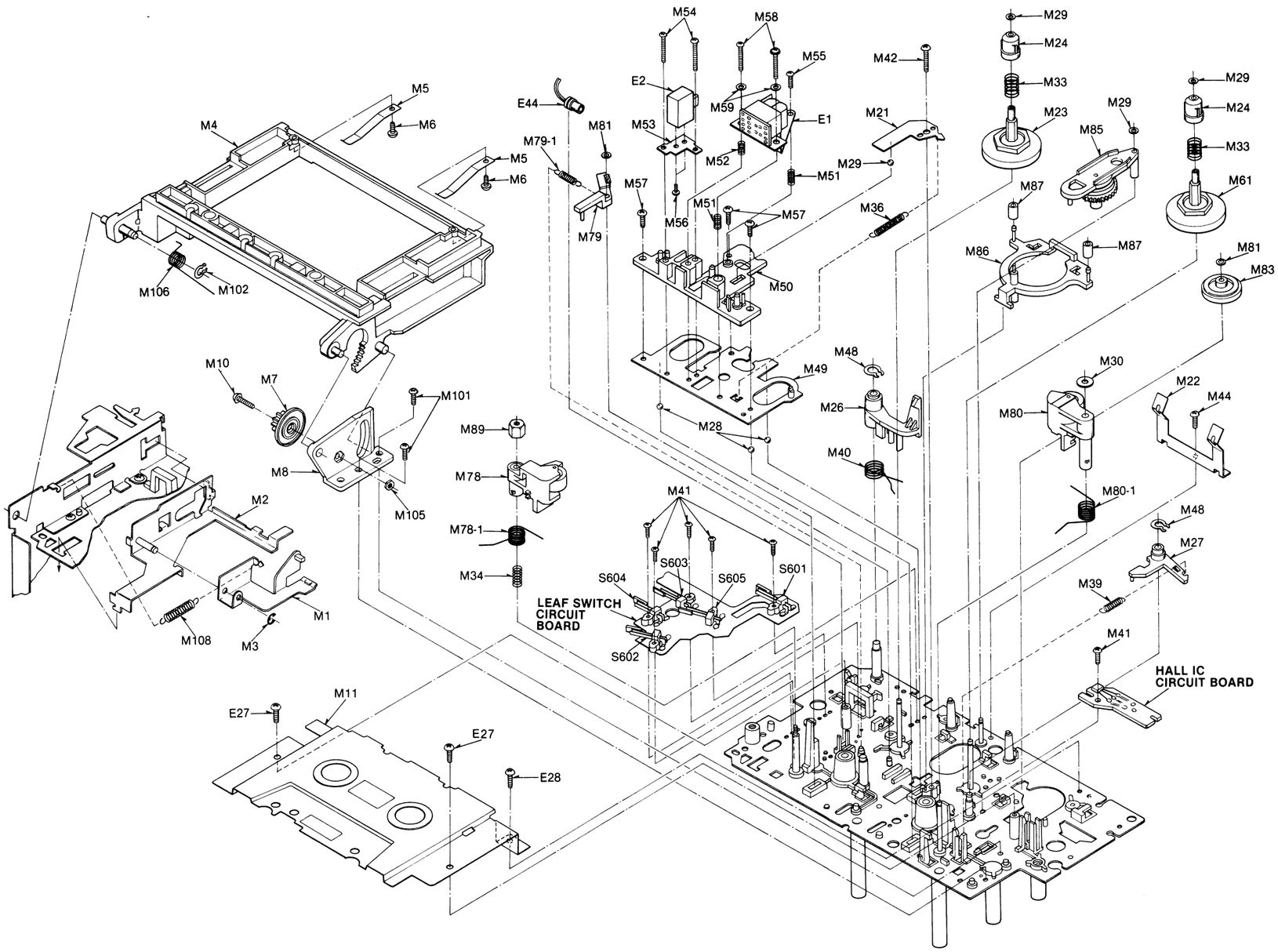


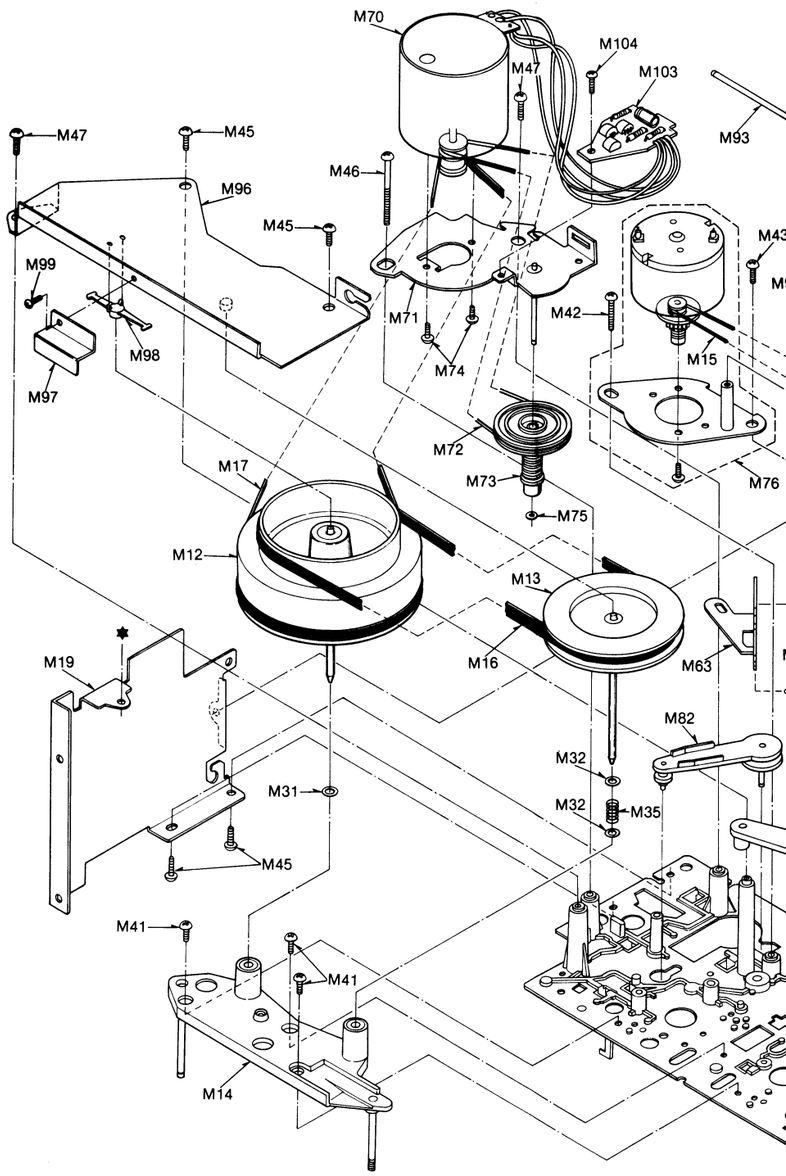
NOTE:

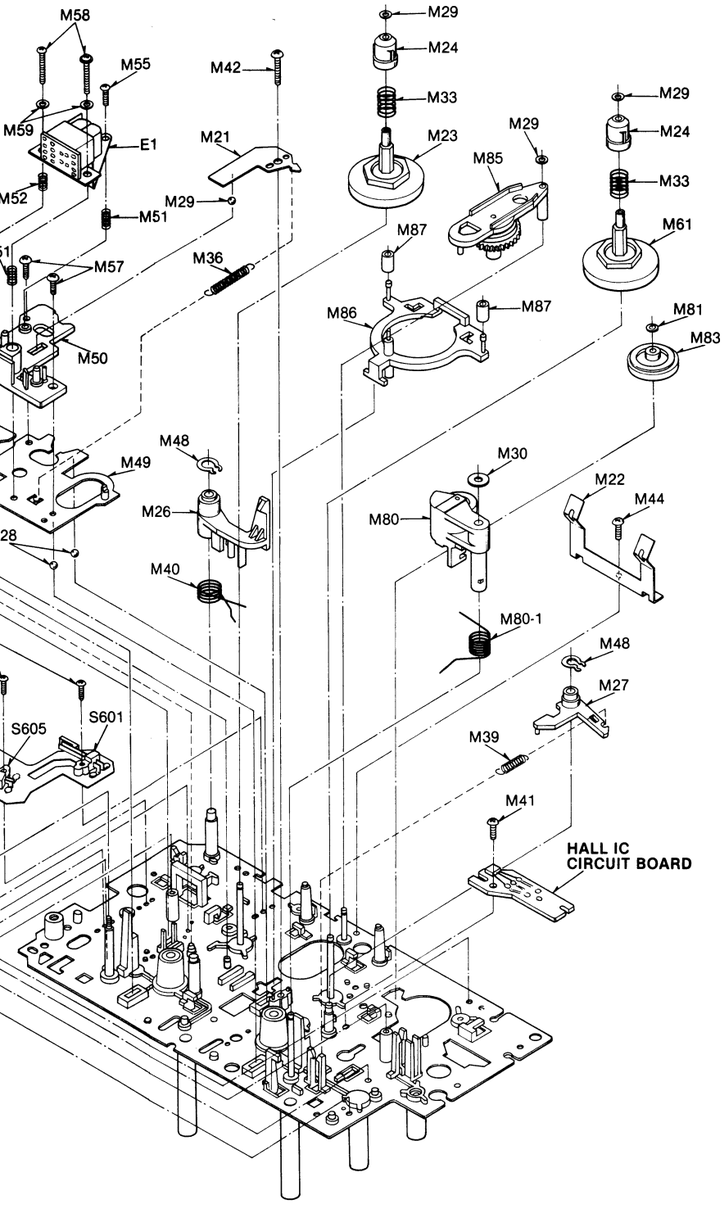
BLK ..... Black
BLU ..... Blue
BRN ..... Brown
GRY ..... Gray
GRN ..... Green
L. BLU ... Light Blue
NIL ..... No Color Mark
ORG ..... Orange
PNK ..... Pink
RED ..... Red
SLD ..... Shield Wire
VLT ..... Violet
WHT ..... White
YEL ..... Yellow

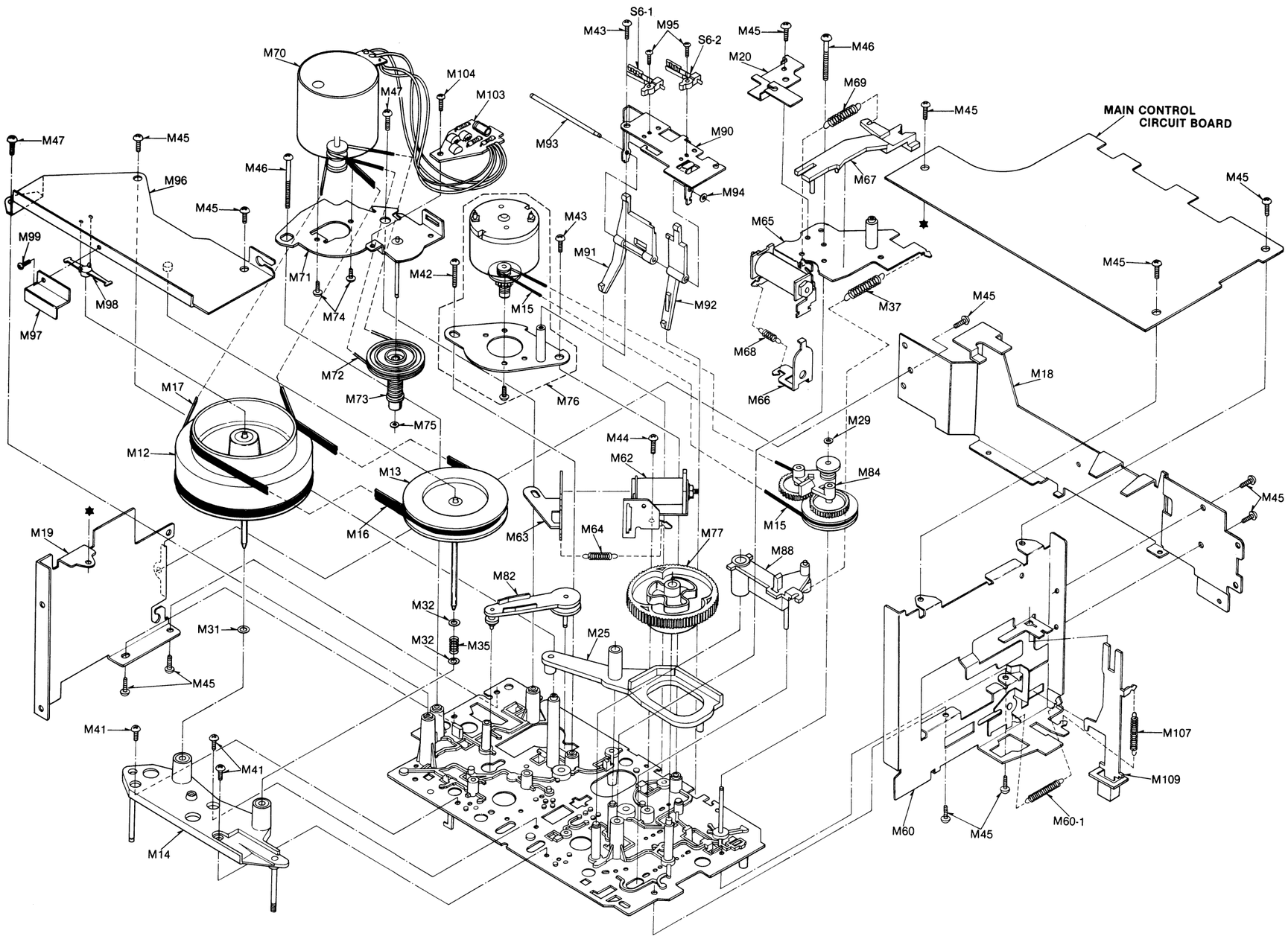
RS-M273

MECHANICAL PARTS LOCATION





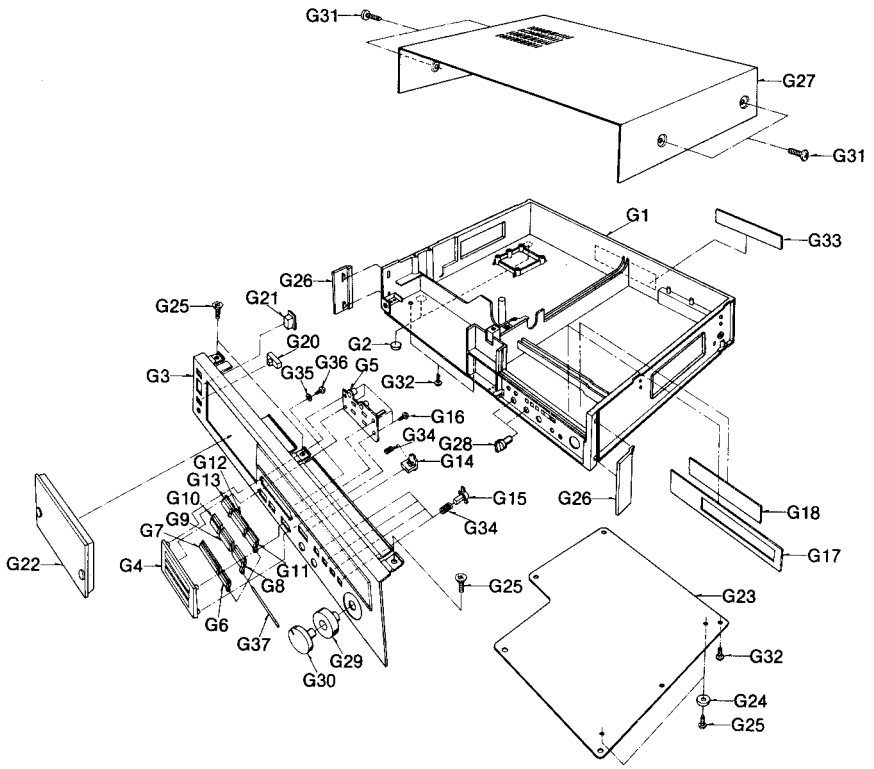




SPECIFICATIONS

Wow and flutter (JIS) * Use test tape ··· QZZCWAT	Less than 0.065% (WRMS)

CABINET PARTS LOCATION



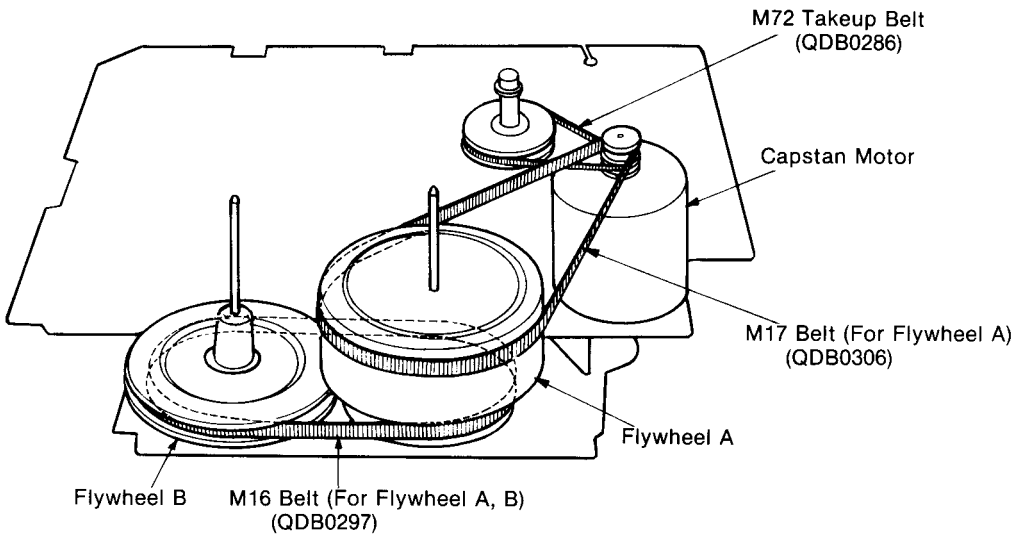
REPLACEMENT PARTS LIST

Ref No.	Part No.	Part Name & Description
	CABINET PARTS	
G 1	QKMM0039K	Main Case
G 2	QKA1081	Rubber Foot
G 3	QYPM0053	Front Panel
	"Silver Type"	
	QYPM0053YK	Front Panel
	"Black Type"	
G 4	QGKM0154	Operation Panel
	"Silver Type"	
	QGKM0154K	Operation Panel
	"Black Type"	
G 5	QKJM0067	Push Button Holder
G 6	QGOM0067	Counter Button
G 7	QGOM0068	Stop Button
	"Silver Type"	
	QGOM0068Y	Stop Button
	"Black Type"	
G 8	QGOM0069	Fast Forward Button
	"Silver Type"	
	QGOM0069Y	Fast Forward Button
	"Black Type"	
G 9	QGOM0070	Playback Button
G 10	QGOM0071	Rewind Button
	"Silver Type"	
	QGOM0071Y	Rewind Button
	"Black Type"	
G 11	QGOM0072	Rec Mute Button
	"Silver Type"	
	QGOM0072Y	Rec Mute Button
	"Black Type"	
G 12	QGOM0073	Pause Button
G 13	QGOM0074	Record Button
G 14	QGOM0075	Monitor Button
G 15	QGOM0076	Push Button
G 16	XTN26 + 8B	Tapping Screw
G 17	QGLM0026	Meter Cover
	"Silver Type"	
	QGLM0026Y	Meter Cover
	"Black Type"	
G 18	QKJM0053	Filter
G 20	QGOM0066	Timer Button
G 21	QGO1900	Push Button (Power ON/OFF)
G 22	QYFM0051	Cassette Lid Assembly
	"Silver Type"	
	QYFM0051K	Cassette Lid Assembly
	"Black Type"	

Ref No.	Part No.	Part Name & Description
G 23	QGCM0056	Bottom Cover
G 24	QKA1082	Leg (Rubber Foot)
G 25	XTS3 + 10B	Tapping Screw
G 26	QGK3201	Side Board
	"Silver Type"	
	QGK3201K	Side Board
	"Black Type"	
G 27	QGCM0057	Case Cover
	"Silver Type"	
	QGCM0057K	Case Cover
	"Black Type"	
G 28	QGT1565	Volume Knob
		(Output Level Control)
G 29	QYT0636	Volume Knob-R
G 30	QYT0367	Volume Knob-L
G 31	XTB4 + 10BFN	Tapping Screw
	"Silver Type"	
	XTB4 + 10BFZ	Tapping Screw
	"Black Type"	
G 32	XTB3 + 10B	Tapping Screw
G 33 [D]	QGSM0154	Main Name Plate
[For all European areas except United Kingdom.]		
[B]	QGSM0155	Main Name Plate
[For United Kingdom.]		
G 34	QBC1407	Switch Spring
G 35	QBW2015	Poly Washer
G 36	XSN26 + 5	Screw ⊕2.6×5
G 37	QMN2732	Switch shaft
	ACCESSORIES	
A 1	RP023A	Connection Cord
A 2 [D]	QQT3147	Instruction Book
[For all European areas except United Kingdom.]		
[B]	QQT3148	Instruction Book
[For United Kingdom.]		
	PACKINGS	
P 1	OPNM0176	Inside Carton
P 2	QPAM0048	Cushion-R
P 3	QPAN0049	Cushion-L
P 4	XZB50X65A02	Poly Bag
P 5	QPQ1052	Sheet
P 6	QPCM0005	Sheet
	"Black Type"	

MNE Y.F D DK B BK Printed in Japan

BELT LOCATION



REPLACEMENT PARTS LIST

Ref No.	Part No.	Part Name & Description
	MECHANICAL PARTS	
M 1	QXL1414	Lock Lever-A
M 2	QXL1507	Lock Lever-B
M 3	XUC25FT	Stop Ring
M 4	QMH2085 "Silver Type"	Cassette Holder
	QMH2085K "Black Type"	Cassette Holder
M 5	QBP1946	Holder Spring
M 6	XTN26+6BFZ	Tapping Screw ⊖2.6×6
M 7	QDG1254	Dumper Gear
M 8	QKJ0499	Dumper Gear Holder
M 9	XWG26	Washer
M 10	XTN26+8	Tapping Screw ⊖2.6×8
M 11	QXH0386 "Silver Type"	Mechanism Cover
	QXH0386K "Black Type"	Mechanism Cover
M 12	QXF0186	Flywheel-A Assembly (Takeup Side)
M 13	QXF0175	Flywheel-B Assembly (Supply Side)
M 14	QXM0172	Thrust Retainer (for Flywheel)
M 15	QDB0287	Belt (for Change Over)
M 16	QDB0297	Belt (for Flywheel-A, B)
M 17	QDB0306	Belt (for Flywheel-A)
M 18	QMA4313	Center Angle
M 19	QMA4312	Side Angle-R
M 20	QMA4080	Angle (Guard)
M 21	QBP1894	Spring (for Head Base Plate)
M 22	QBP1895	Spring (for Cassette Pressure)
M 23	QDR1150	Reel Table (Supply Side)
M 24	QMB1336	Supply Driving Click
M 25	QML3655	Lever (Cam Forrower)
M 26	QML3611	Lever (Detector)
M 27	QML3660	Lever (for Idrer Change Over)
M 28	QDK1012	Steel Ball
M 29	QBW2008	Washer
M 30	QBW2046	Washer
M 31	QBW2049	Washer
M 32	QBW2089	Washer
M 33	QBC1373	Spring
M 34	QBC1376	Spring
M 35	QBC1375	Spring
M 36	QBT1927	Spring
M 37	QBT1939	Lock Lever Spring
M 39	QBT1920	Spring (for Idler)
M 40	QBN1772	Spring (for Detector)
M 41	XTN2+5B	Tapping Screw
M 42	XTN26+12B	Tapping Screw
M 43	XTN26+6B	Tapping Screw ⊕2.6×6
M 44	XTN26+8B	Tapping Screw ⊕2.6×8
M 45	XTN3+6B	Tapping Screw ⊕3×6
M 46	XTN3+24B	Tapping Screw ⊕3×24
M 47	XTN3+10B	Tapping Screw ⊕3×10
M 48	XUB4FT	Stop Ring
M 49	QXK2541	Head Base Plate
M 50	QMZ1264	Head Spacer
M 51	QBC1103	Spring
M 52	QBC1339	Spring

Ref No.	Part No.	Part Name & Description
M 53	QMZ1265	Erase Head Spacer
M 54	XSN2+12	Screw ⊕2×12
M 55	XSN2+8	Screw ⊕2×8
M 56	XSN2+3	Screw ⊕2×3
M 57	XTN26+5B	Tapping Screw
M 58	XSN2+14	Screw ⊕2×14
M 59	XWG2	Washer
M 60	QXA1191	Side Angle-L
M 60-1	QBT1755	Spring
M 61	QXD0120	Reel Table
M 62	QXA1075	Angle (with Plunger)
M 63	QML3650	Lever (for Plunger)
M 64	QBT1924	Spring
M 65	QXA1195	Pressurer Plate
M 66	QML3800	Lever
M 67	QML3653	Lever
M 68	QBT1938	Trigger Spring
M 69	QBT1278	Lock Spring
M 70	QXU0268	Capstan Motor
M 71	QXA1077	Angle (for Takeup Motor)
M 72	QDB0286	Takeup Belt
M 73	QXP0621	Takeup Pulley
M 74	XSN26+3	Screw ⊕2.6×3
M 75	QBW2008	Washer
M 76	QXU0250	Reel Motor
M 77	QXG1059	Gear
M 78	QXL1448	Pressure Roller Lever-L
M 78-1	QBN1804	Pressure Roller Spring
M 79	QXL1449	Lever
M 79-1	QBT1922	Spring
M 80	QXL1406	Pressure Roller Lever-R
M 80-1	QBN1771	Pressure Roller Spring
M 81	QBW2008	Washer
M 82	QXL1423	Lever
M 83	QXi0116	Idler
M 84	QXL1408	Lever
M 85	QXL1409	Lever (Fast Forward)
M 86	QML3659	Lever
M 87	QBG1132	Stopper Rubber
M 88	QXL1411	Lever
M 89	QXQ0112	Nut
M 90	QMA4072	Angle (Auto Tape Select)
M 91	QML3717	Lever (CrO_2 Tape Detect)
M 92	QML3716	Lever (Metal Tape Detect)
M 93	QMN2642	Shaft
M 94	QBW2008	Washer
M 95	XTN2+5B	Tapping Screw
M 96	QXA1217	Flywheel Retainer
M 97	QMA4336	Cover Angle
M 98	QMZ1283	Flywheel Thrust Retainer
M 99	XTN26+6B	Tapping Screw ⊕2.6×6
M 101	XTN26+10B	Tapping Screw ⊕2.6×10
M 102	XUB4FT	Stop Ring
M 103	QEi1934	Motor Circuit Board
M 104	XSN2+6	Screw ⊕2×6
M 105	XNG26	Nut
M 106	QBN1878	Holder Spring
M 107	QBT1566	Eject Spring
M 108	QBT1691	Lock Lever Spring
M 109	QXR0780	Eject Button

ORDER NO. ARD- 8311029P

Parts Change Notice

(D)...For all European areas except United Kingdom.
(B)...For United Kingdom.
(N)...For Asia, Latin America, Middle East and Africa areas.
(P)...For U.S.A.
(C)...For Canada.

Model No.

RS-M273

Please revise the original parts list in the Service Manual to conform to the change(s) shown herein. If new part numbers are shown, be sure to use them when ordering parts.

Reason for Change	*The circled item indicates the reason. If no marking, see the Notes in the bottom column.
1. Improve performance	
2. Change of material or dimension	
3. To meet approved specification	
4. Standardization	
5. Addition	
6. Deletion	
7. Correction	
8. Other	

Interchangeability Code			**The circled item indicates the interchangeability. If no marking, see the Notes in the bottom column.
	Parts	Set Production	
A	Original → Early New → Late		Original or new parts may be used in early or late production set. Use original parts until exhausted, then stock new parts.
B	Original → Early New → Late		Original parts may be used in early production sets only. New parts may be used in early or late production sets. Use original parts where possible, then stock new parts.
C	Original → Early New → Late		New parts only may be used in early or late production sets. Stock new parts.
D	Original → Early New → Late		Original parts may be used in early production sets only. New parts may be used in late production sets only. Stock both original and new parts.
E	Other		

Part Number

Model No.	Ref. No.	Original Part No.	New Part No.	Notes (*-**)	Part Name & Descriptions
RS-M273	G29	QYT0636	QYT0647	2-D	Volume Knob-R
"	G30	QYT0367 ↓correction QYT0637	QYT0648	"	Volume Knob-L

File this Parts Change Notice with your copy of the Service Manual.

Original Service Manual is Model No. RS-M273(P/C) Order No. ARD82010114C1-23.
(D/B) Order No. ARD81090091C2-23.
(N) Order No. ARD82020123C3-17.

Technics

National / Panasonic

Matsushita Electric Trading Co., Ltd.
P.O. Box 288, Central Osaka Japan
Printed in Japan

ORDER NO. ARD82020091S2-02

Service Manual

Supplement-1

Cassette Deck

RS-M273

(Silver Face
Black Face)

Microprocessor Controlled Cassette Deck
with 3-Head, Closed Loop System

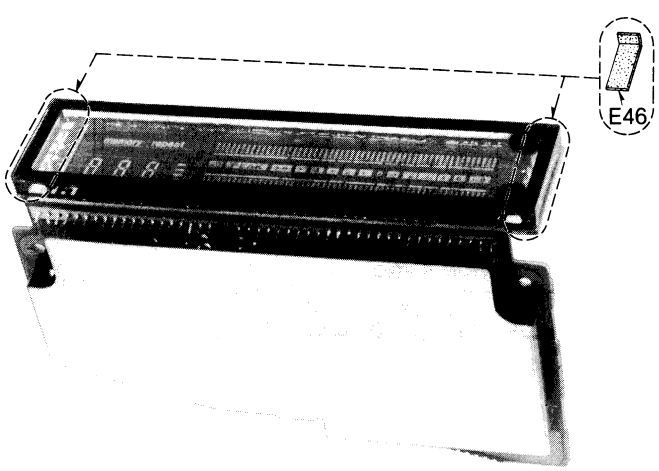
DOLBY SYSTEM

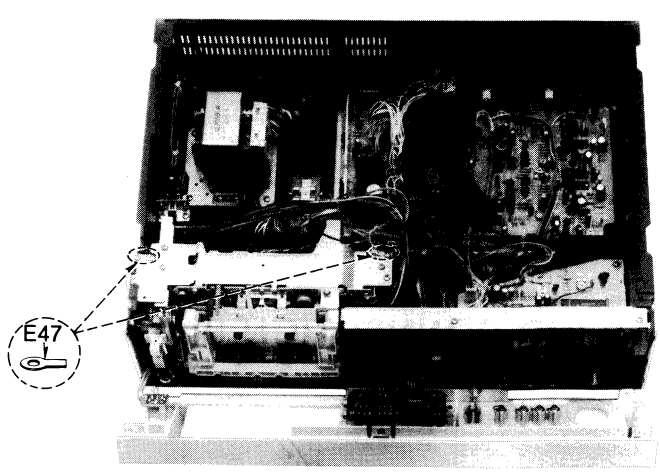
This is the Service Manual for the following areas.
D ..... For all European areas except United Kingdom.
B ..... For United Kingdom.

Please use this manual together with the service manual for model No. RS-M273 (original) order No. ARD81090091C2-23.

ELECTRICAL PARTS LOCATION

(ADDITION)





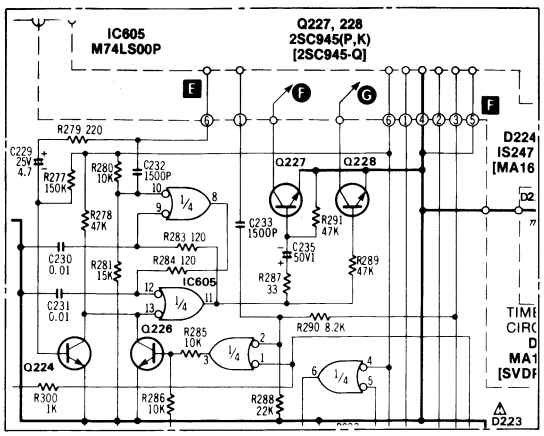
* 'Dolby' and the double-D symbols are trademarks of Dolby Laboratories.

Technics

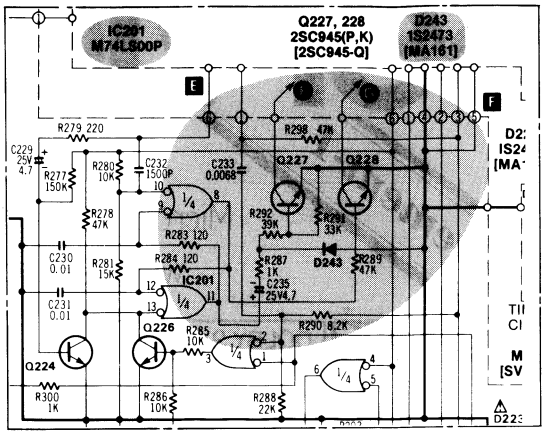
Matsushita Electric Trading Co., Ltd.
P.O. Box 288, Central Osaka Japan

SCHEMATIC DIAGRAM

Main Section (DIFFERENCE)



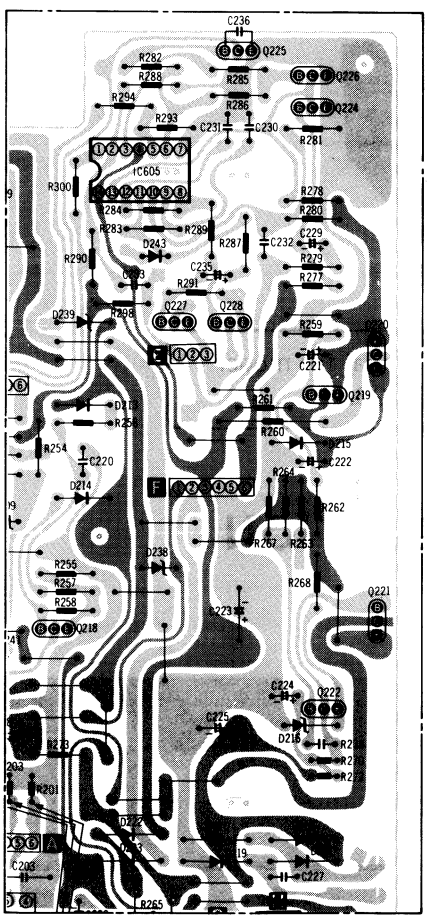
Former Type



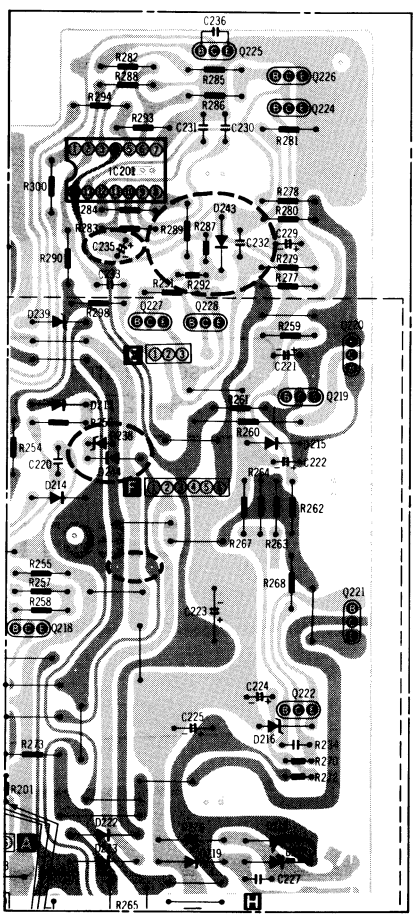
New Type

CIRCUIT BOARDS

Main Circuit Board (DIFFERENCE)

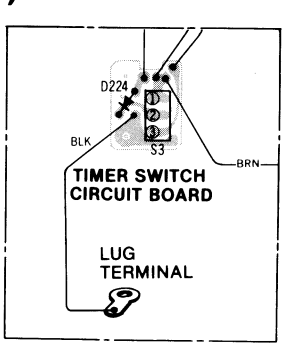


Former Type

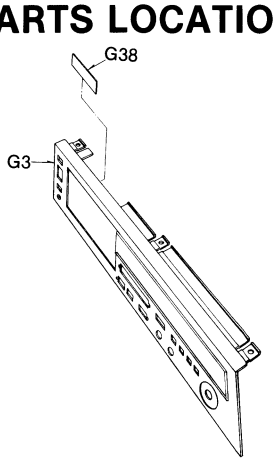


New Type

WIRING CONNECTION DIAGRAM (ADDITION)

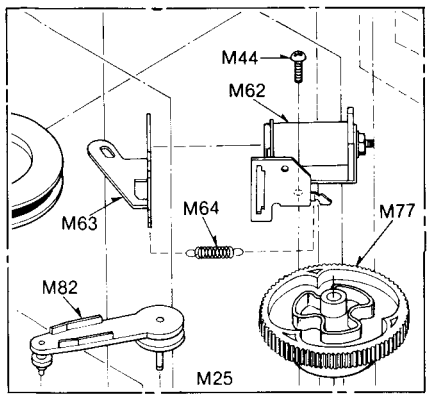


CABINET PARTS LOCATION (ADDITION)

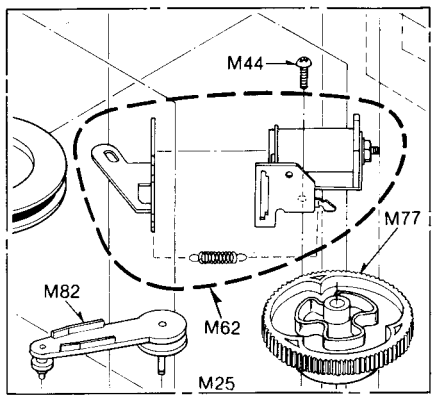


MECHANICAL PARTS LOCATION

(DIFFERENCE)

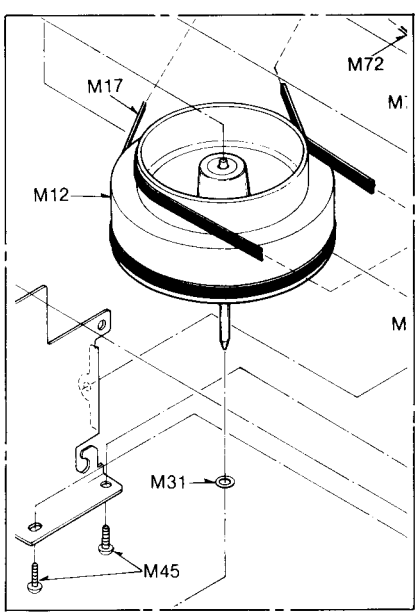


Former Type

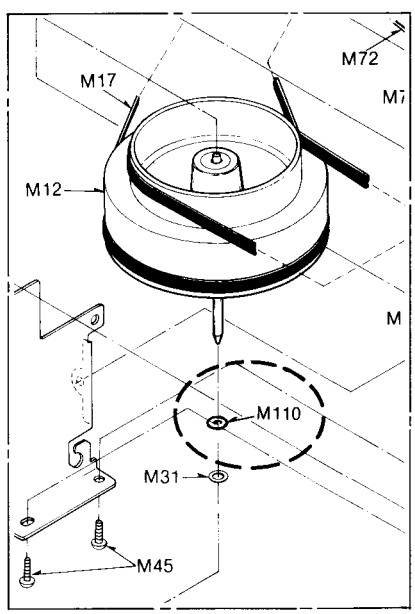


New Type

(ADDITION)

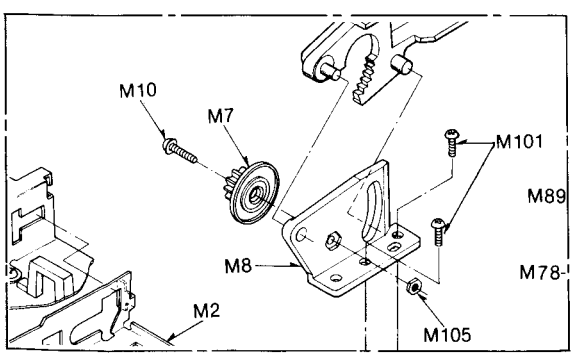


Former Type

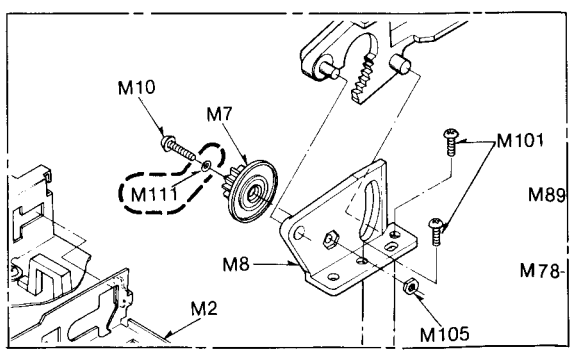


New Type

(ADDITION)



Former Type



New Type

PARTS COMPARISON TABLE:

Please revise the original parts list in the Service Manual to conform to the changes shown herein.
If new parts number are shown, be sure to use them when ordering parts.

Important safety notice.
Components identified by ⚠ mark have special characteristics important for safety.
When replacing any of these components, use only manufacturer's specified parts.

Ref. No.	Parts Name & Description	Parts Number		Remarks
		Former Type	New Type	
M10	Screw ⊕2.6×8	XTN26+8	XSN26+8	
M26	Lever (Detector)	QML3611	QML3661	
M62	Angle Assembly (with Plunger)	QXA1075	QXA1072	
M63	Lever (for Plunger)	QML3650	———	Deleted
M64	Spring	QBT1924	———	Deleted
M70	Capstan Motor	QXU0268	QXU0269	
M80	Pressure Roller Lever-R	QXL1406	QXL1532	
M80-1	Pressure Roller Spring	QBN1771	QBN1884	
M110	Washer	———	QBJ3221	Added
M111	Washer 2.6φ	———	XWG26	Added
R137, 138	Resistor	ERO25TKG2003 (200kΩ)	ERO25CKG2003 (200kΩ)	
R157	Resistor	ERD25FJ221 (220Ω)	ERQ14AJ181P (180Ω)	
R167, 168	Resistor	ERD25FJ330 (33Ω)	ERD25FJ101 (100Ω)	
R235	Resistor	ERD25TJ183 (18kΩ)	ERD25TJ393 (39kΩ)	
R236	Resistor	ERD25FJ562 (5.6kΩ)	ERD25FJ472 (4.7kΩ)	
R237	Resistor	ERD25FJ682 (6.8kΩ)	ERD25FJ472 (4.7kΩ)	
R253	Resistor	ERD25TJ273 (2.7kΩ)	ERD25TJ104 (100kΩ)	
R256	Resistor	ERD25FJ122 (1.2kΩ)	ERD25FJ272 (2.7kΩ)	
R264	Resistor	ERO25KF1502 (15kΩ)	ERO25CKF1502 (15kΩ)	
R269	Resistor	ERG1ANJ3R9 (3.9Ω)	———	Deleted
R273	Resistor	ERQ12AJ181P (180Ω, 1/2W)	ERD25FJ271 (270Ω, 1/4W)	
R287	Resistor	ERD25FJ330 (33Ω)	ERD25FJ102 (1kΩ)	
R289	Resistor	ERD25FJ473 (47kΩ)	ERD25FJ102 (1kΩ)	
R291	Resistor	ERD25TJ473 (47kΩ)	ERD25TJ393 (39kΩ)	
R292	Resistor	ERD25FJ103 (10kΩ)	ERD25TJ393 (39kΩ)	
R298	Resistor	———	ERD25TJ473 (47kΩ)	Added
R313, 314	Resistor	ERO25KG2702S (27kΩ)	ERO25CKF2702S (27kΩ)	
C5, 6	Capacitor	ECKD1H561KB (560pF)	ECKD1H471KB (470pF)	
C21	Capacitor	ECEA1ES101 (16V 100μF)	ECEA1CS221 (16V 220μF)	
C34	Capacitor	———	ECQM1H273JZ (0.027μF)	Added
C58	Capacitor	ECEA50Z3R3 (50V 3.3μF)	ECEA50Z1 (50V 1μF)	
C155, 156	Capacitor	ECQV05153JZ (0.015μF)	ECQV05103JZ (0.01μF)	
C206	Capacitor	ECQF6682KZH (0.0068μF)	ECQM1H682JZ (0.0068μF)	
C215	Capacitor	ECEA1CN100S (16V 10μF)	ECEA1CN220S (16V 22μF)	
C233	Capacitor	ECKD1H152KB (0.0015μF)	ECQM1H682JZ (0.0068μF)	
C235	Capacitor	———	ECEA25Z4R7 (25V 4.7μF)	Added
C301, 302	Capacitor	ECEA50Z3R3 (50V 3.3μF)	ECEA50ZR22 (50V 0.22μF)	
D238	Diode	RD5R6EB	RD3R9EB	
D243	Diode	———	MA161	Added
IC201	Integrated Circuit	———	M74LS00P	Added
IC606	Integrated Circuit	M74LS00P	———	Deleted
F1 ⚠	Fuse (T 1.6A)	XBA0010	XBAQ0010	
E1	Head (Record/Playback)	QWY4125ZA	QWY4125W	
E46	Meter Cushion	———	QBMM0019	Added
E47	Lug Terminal	———	QTD1001	Added
G17	Meter Cover "Silver Type"	QGLM0026	QGLM0033	
	Meter Cover "Black Type"	QGLM0026Y	QGLM0033Y	
G38	Spacer	———	QGKM0167	Added
P7	Spacer	———	QPAM0051	Added
P8	Pad	———	QPS0434	Added

MNE
H.M D DK B BK
Printed in Japa